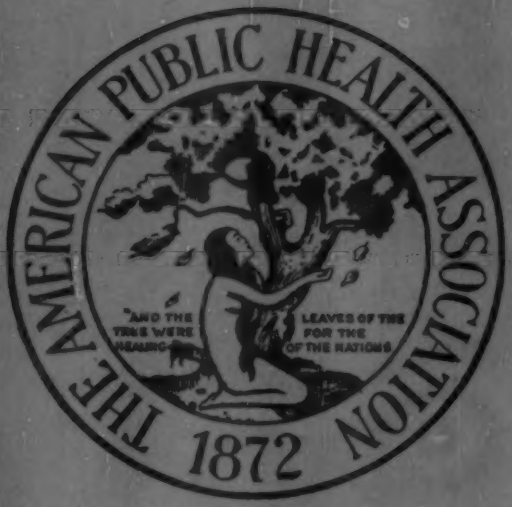
American Journal of

PUBLIC HEALTH

and The Nation's Health



MARCH, 1957

volume 47

number 3

The Original Quaternary...

Roccal

Reg. U.S. Pat. Off. and Canada

BRAND

SANITIZING AGENT

Prepared like a Fine Pharmaceutical

In every step of its manufacturing, ROCCAL is laboratory controlled . . . prepared with utmost precision under rigid specifications. For ROCCAL, the nation's first and foremost quaternary ammonium germicide, is a product of one of the world's leading pharmaceutical manufacturers.

Triple-checked to insure uniformity, potency and quality, ROCCAL is initially tested at the manufacturing level. Then a sample of each batch of ROCCAL must pass a comprehensive examination at Sterwin's Control Laboratories at Rensselaer, New York. A third and final test is made when the product is bottled.

Many public health and sanitation officials throughout the country recognize ROCCAL as the "standard" quaternary ammonium germicide. In restaurants, taverns, soda fountains, schools, dairies, hotels, food processing and packing plants, institutions—wherever a reliable germicide is required—ROCCAL can be depended upon to do a better sanitizing job *every* time.

In recommended dilutions, ROCCAL is a potent bactericide: stable, tasteless, odorless, stainless, non-irritating, non-corrosive, non-poisonous.

HIGH HARD WATER TOLERANCE

Laboratory investigations have proved ROCCAL to be effective in most hard waters without the aid of sequestrants.

Further technical information on ROCCAL and samples will be gladly provided on request . . .

Sterwin Chemicals Inc.

Subsidiary of Sterling Drug Inc.

1450 Broadway, New York 18, N. Y.

NEW!

FOR MASS IMMUNIZATION!

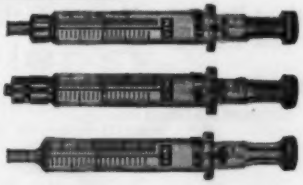
VIM FORSBECK NEEDLE HOLDER WITH PORCELAIN WHEEL

New glazed porcelain needle holder accommodates 28 VIM needles. Highly resistant to heat and chemicals, new unit may be sterilized by boiling, autoclaving, or dry heat. Needle can be attached to syringe with slight twist and forward pressure and replaced after injection without hand contact. Rack may be removed from base by handle and replaced by second filled rack without delay.

VIM HYPODERMIC NEEDLES

Three complete lines — VIM Laminex, Vim Stainless Steel and Damascus.

VIM HYPODERMIC SYRINGES



A wide range of syringe selection, including VIM standard ground, VIM interchangeable and Damascus syringes.

For complete data, write to

MacGREGOR INSTRUMENT COMPANY, NEEDHAM, MASS.

American Journal of

PUBLIC HEALTH

and the Nation's Health

Official Monthly Publication of the American Public Health Association, Inc.

Volume 47 | March, 1957 | Number 3

ABEL WOLMAN, DR.ENG., Editor
RAYMOND S. PATTERSON, PH.D., Associate Editor
REGINALD M. ATWATER, M.D., Managing Editor

EDITORIAL BOARD

JOHN D. PORTERFIELD, M.D., Chairman
MARTHA L. CLIFFORD, M.D.
HOWARD W. ENNES, JR., M.P.H.
NORMAN JOLLIFFE, M.D.
EDMUND K. KLINE, DR.P.H.
GEORGE ROSEN, M.D.
The Editor, Associate Editor, and Managing Editor

STAFF

LYDIA GARI, Editorial Assistant
ELIZABETH KELLOGG, Editorial Assistant
FRANCES TOOROCK, Editorial Associate
WILLIMINA RAYNE WALSH, Associate Secretary

CONTENTS

PAGE

Measles Virus: A Summary of Experiments Concerned with Isolation, Properties, and Behavior 275
JOHN F. ENDERS, PH.D.; THOMAS C. PEEBLES, M.D.; KEVIN MCCARTHY, M.D.; MILAN MILOVANOVIC, M.D.; ANNA MITUS, M.R.C.P.; AND ANN HOLLOWAY

Symposium on Controlled Vaccine Field Trials: Poliomyelitis 283
THOMAS FRANCIS, JR., M.D.

The Role of Preventive Medicine in Highway Safety 288
ROSS A. MCFARLAND, PH.D.

The Versatility of the Life Table 297
MORTIMER SPIEGELMAN

Continued on page vi

The American Journal of Public Health is published by the American Public Health Association, Inc., at 374 Broadway, Albany 7, N. Y. Executive office 1790 Broadway, New York 19, N. Y. Subscription price $10.00 per year for United States, elsewhere $11.00 to cover postage. Single copies $1.00 postpaid. Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932, under the Act of March 3, 1879. Published monthly. Copyright 1957, by American Public Health Association, Inc. The American Journal of Public Health is indexed in the Industrial Arts Index and, in part, in the Quarterly Cumulative Index Medicus, Biological Abstracts, Chemical Abstracts, Engineering Index, and Public Affairs Information Service.

Address all correspondence to the Managing Editor, 1790 Broadway, New York 19, N. Y.

"MYSOLINE" effectively controls grand mal and psychomotor seizures

Control of seizures was obtained in 57 per cent of 97 grand mal patients where "MYSOLINE" was used as initial therapy; an additional 22 per cent were improved.[1] In patients refractory to previous standard medication, Pence[2] obtained improvement to complete control in 70 per cent of cases. In his study, "MYSOLINE" was added to current medication and in some cases this was replaced by "MYSOLINE" alone. He observed that patients can usually remain under control without necessitating dosage increases above the established maintenance level. "Grand mal convulsions, psychomotor automatisms and focal motor convulsive disorders respond most readily to this drug."[3]

NOTABLY FREE FROM SERIOUS TOXIC EFFECTS

Urinalyses and blood counts during therapy failed to reveal any abnormalities.[2] When side reactions do occur, they are usually mild and transient and tend to disappear as therapy is continued.

"MYSOLINE"®

Brand of Primidone

in epilepsy

Supplied: 0.25 Gm. scored tablets, bottles of 100 and 1,000.

LITERATURE ON REQUEST

1. Livingston, S., and Petersen, D.: New England J. Med. *254*:327 (Feb. 16) 1956.
2. Pence, L. M.: Texas State J. Med. *50*:290 (May) 1954.
3. Berman, B. A.: Am. J. Psychiat. *112*:541 (Jan.) 1956.

Ayerst Laboratories • New York, N.Y. • Montreal, Canada

"Mysoline" is available in the United States by arrangement with Imperial Chemical (Pharmaceuticals) Limited.

5656

Contents—Continued PAGE

The Federal Water Pollution Control Act of 1956 305
CURTISS M. EVERTS, JR., AND ARVE H. DAHL

Some Factors Relating to Degree of Correspondence for Diagnostic Information as Obtained by Household Interviews and Clinical Examinations . . 311
JACK ELINSON, PH.D., AND RAY E. TRUSSELL, M.D., M.P.H.

Major Medical Expense Insurance: An Evaluation 322
JEROME POLLACK

Public Health's Unmet Needs in Home and Farm Safety 335
CHARLES M. CAMERON, JR., M.D., M.P.H.

The Food and Drug Administration Regulations as They Pertain to Foods Processed by New Methods 341
MALCOLM R. STEPHENS

Engineering Aspects of the Disposal of Radioactive Wastes from the Peacetime Applications of Nuclear Technology 345
JOSEPH A. LIEBERMAN, DR. ENG.

Chronic Disease Services in Local Health Departments—Report of a Survey 352
JONAS N. MULLER, M.D., M.P.H., AND EDWARD B. KOVAR

EDITORIALS:

The Midas Touch in So-Called "Useless" Knowledge 363

Preventing Home Accidents—The Progress Is Slow 364

COMMITTEE REPORT:

Report on American Sanitary Engineering Intersociety Board 365
GEORGE O. PIERCE, M.S., AND MARK D. HOLLIS, C.E.

Clearing House on Public Health Salary Information and Personnel Needs . 368

Credit Lines 371

Books and Reports 374

Books Received 379

A Selected Public Health Bibliography 381

Association News 384
APHA Recruitment Project Under Way. Revisions of Standard Methods for Dairy Products.

News of Affiliated Societies and Branches 386

Employment Service 387

News from the Field 393

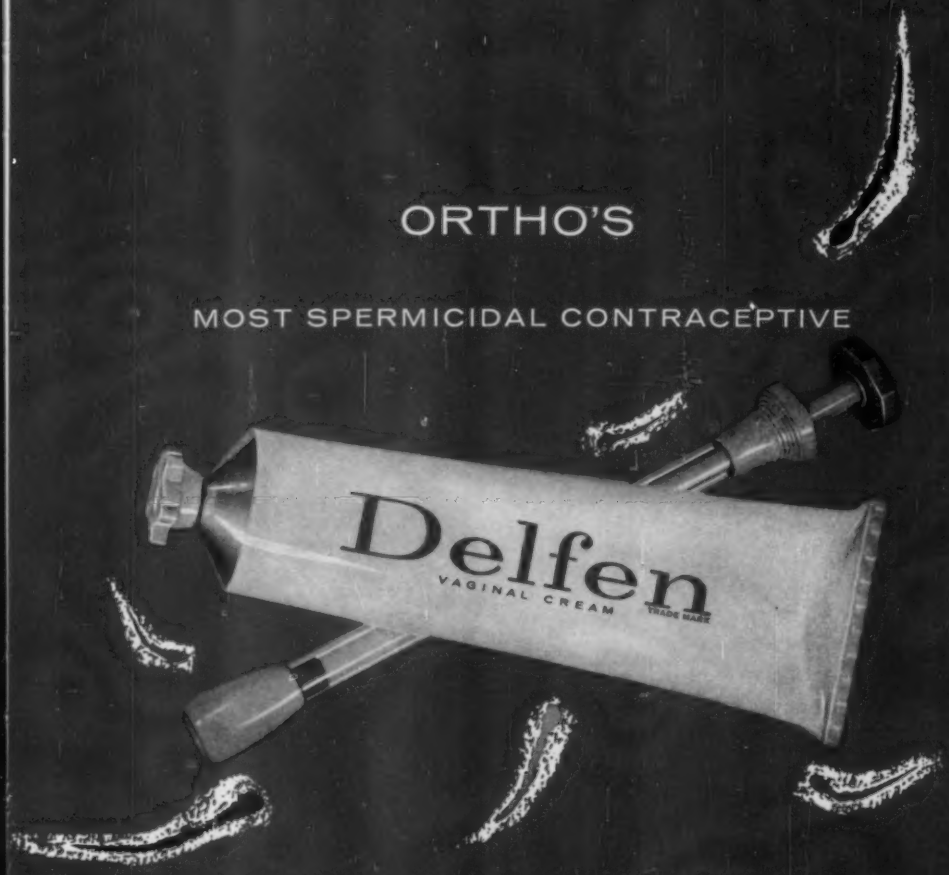
Conferences and Dates 400

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear. These are not to be regarded as expressing the views of the American Public Health Association, Inc., unless formally adopted by the vote of the Association.

Reprint prices in quantity furnished upon request.

ORTHO'S

MOST SPERMICIDAL CONTRACEPTIVE



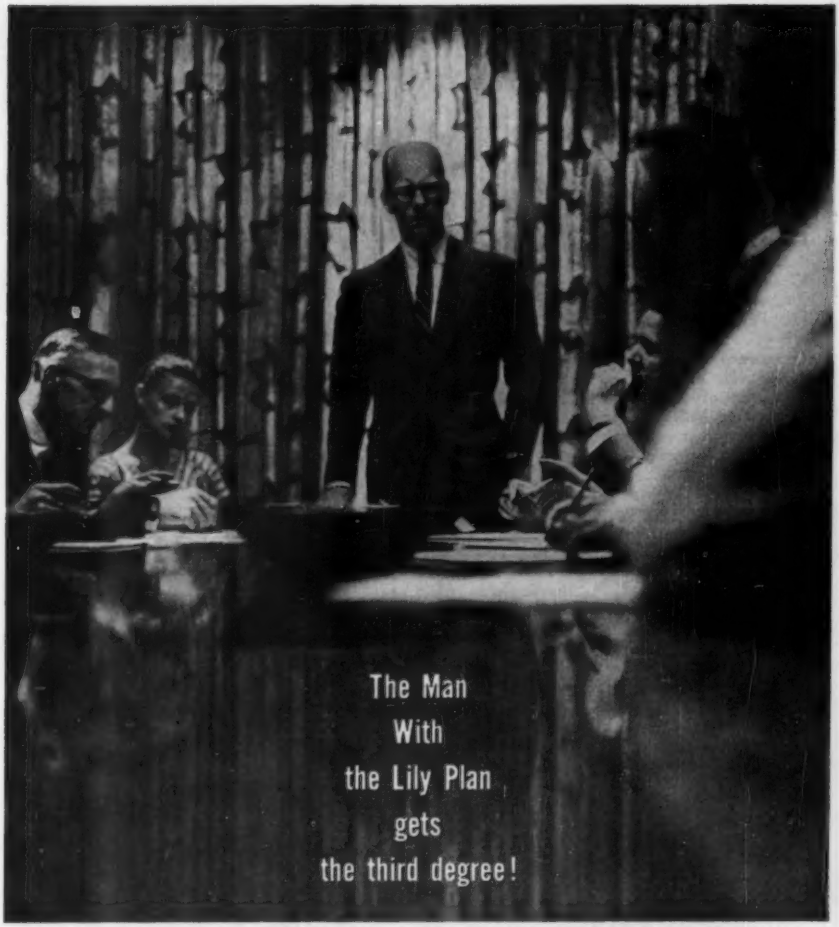
used with a measured-dose applicator
for simplicity, esthetic appeal and
wider patient acceptance.

Ortho

Serve Coke at home... make hospitality easy

INDEX TO ADVERTISERS

	Page
American Public Health Association:	
Book Service	XXXII, XXXIV
Governing Council	X, XI
Membership Application Blank	XXXIII
Sustaining Members	XXX
American Can Company	XXVI
Ayerst Laboratories (Mysoline)	V
Baltimore Biological Laboratory, Inc. (Animal Blood Products and Diagnostic Reagents)	XXXV
Becton, Dickinson and Company (Vacutainers)	XV
Brown Laboratory	XXXI
Cereal Institute, Inc. (4th Annual Spring Cereal and Milk Festival)	XXIX
Coca-Cola	VIII
Corning Glass (New Dispenser Package)	XII
Difco Laboratories	Back Cover
Directory of Health Service	XXXIII
Black & Veatch	
Dickman Laboratories	
Emerson Venable, P.E.	
Professional Examination Service, APHA	
Exposition Press	400
Fairfield Chemical Division (Pyrenone Dairy Sprays)	XIII
Florida Citrus Commission	XXV
Hanovia Chemical & Mfg. Co. (Inspectolites and Safe-T-Aires)	XXXV
International Equipment Co. (Centrifuge Model HT)	XVI
Kimble Glass (New Kimble Items)	XVIII, XIX
Lederle Laboratories (Mumps Vaccine)	XXXV
E. Leitz, Inc. (Microprojectors)	XXVII
Lily-Tulip Cup Corp. (Film—"Healthy Kitchen")	IX
MacGreogor Instrument Company	III
Millipore Filter Corporation	XX, XXI
Modern Swimming Pool Co., Inc.	XXXI
National Dairy Council (The right start)	XXXVI
Olin Mathieson (Chlorine sanitizing products)	XVII
Ortho Pharmaceutical (Delfen)	VII
Oval Wood Dish Corp. (Ritespoons)	XXXVII
Pfizer Laboratories, Division Chas. Pfizer & Co., Inc. (Signamycin)	XXII, XXIII
Pennsylvania Salt Manufacturing Co. (BryKo Clean)	XXIV
Sterwin Chemicals, Inc. (Roccal Sanitizing Agent)	II
Wallace & Tiernan, Inc. (New V-Notch Chlorinators)	XXVIII
Wallace & Tiernan, Inc., Maltbie Laboratories Division (Ointment Salundek)	XXXI
Wyeth, Inc. (Bicillin)	XIV



Result: A training strip film to instruct food service workers in restaurants, schools and industrial dining rooms!

Here Health personnel grill The Man With the Lily* Plan on a vital problem: how to educate kitchen help, waitresses, food managers on the importance and methods of obtaining absolutely sanitary food service.

True to his reputation for problem-solving, The Man With the Lily Plan comes up with an imaginative answer: a free four-color film strip made especially to help you communicate the "healthy kitchen" story to the average food service worker. Health experts find this lively, graphic film strip fast, effective and thorough. It not only treats the proper use of paper service, but also the correct methods of washing china and glassware.

Why not use it? It will cost you nothing. Write Lily today! *Lily-Tulip Cup Corporation, 122 East 42nd Street, New York 17, N. Y.; Chicago, Kansas City, Los Angeles, San Francisco, Seattle, Toronto.* *T.M. REG. U.S. PAT. OFF.

AMERICAN PUBLIC HEALTH ASSOCIATION, Inc.
GOVERNING COUNCIL

OFFICERS 1956–1957

President, John W. Knutson, D.D.S, Washington, D. C.
President-Elect, Roy J. Morton, C.E., Oak Ridge, Tenn.
Vice-President, Miguel E. Bustamante, M.D., Mexico, D.F., Mexico
Vice-President, Morley R. Elliott, M.D., Winnipeg, Man., Canada
Vice-President, Fred T. Foard, M.D., Raleigh, N. C.
Treasurer, Charles Glen King, Ph.D., New York, N. Y.
Chairman of Executive Board, Lawrence J. Peterson, M.S.P.H., Boise, Idaho
Executive Secretary, Reginald M. Atwater, M.D., New York, N. Y.

EXECUTIVE BOARD

Chairman, Lawrence J. Peterson, M.S.P.H., Boise, Idaho (1959)
George A. Denison, M.D., Birmingham, Ala. (1957)
Thomas R. Hood, M.D., Topeka, Kans. (1958)
Charles Glen King, Ph.D., New York, N. Y. (Treasurer)
John W. Knutson, D.D.S., Washington, D. C. (President)
Roy J. Morton, C.E., Oak Ridge, Tenn. (President-Elect)
John D. Porterfield, M.D., Washington, D. C. (1959)
Marion W. Sheahan, R.N., New York, N. Y. (1957)
Ernest L. Stebbins, M.D., Baltimore, Md. (1958)

ELECTIVE COUNCILORS

Terms Expiring 1957

Lester Breslow, M.D., Berkeley, Calif.
George D. W. Cameron, M.D., Ottawa, Ont., Canada
Selwyn D. Collins, Ph.D., Washington, D. C.
Warren A. Cook, Ann Arbor, Mich.
Mayhew Derryberry, Ph.D., Washington, D. C.
Ann W. Haynes, M.P.H., Berkeley, Calif.
Norman Jolliffe, M.D., New York, N. Y.
Clarence W. Klassen, Springfield, Ill.
Lucile Petry Leone, R.N., M.A., Washington, D. C.
Lucy S. Morgan, Ph.D., Chapel Hill, N. C.
Charles E. Smith, M.D., Berkeley, Calif.
Samuel M. Wishik, M.D., Pittsburgh, Pa.
Jacob Yerushalmy, Ph.D., Berkeley, Calif.

Terms Expiring 1958

George Baehr, M.D., New York, N. Y.
Robert A. Kehoe, M.D., Cincinnati, Ohio
Paul A. Lembeke, M.D., Baltimore, Md.
Berwyn F. Mattison, M.D., Harrisburg, Pa.
Mac H. McCrady, D.Sc., Montreal, Que., Canada
Pearl McIver, R.N., Washington, D. C.
Dorothy B. Nyswander, Ph.D., Berkeley, Calif.
Beryl J. Roberts, Dr.P.H., Boston, Mass.
Edward S. Rogers, M.D., Berkeley, Calif.
Charles L. Senn, Los Angeles, Calif.
Fredrick J. Stare, M.D., Boston, Mass.
Franklin H. Top, M.D., Iowa City, Iowa
Charles C. Wilson, M.D., New Haven, Conn.

Terms Expiring 1959

Justin M. Andrews, Sc.D., Washington, D. C.
Margaret G. Arnstein, R.N., Washington, D. C.
Herbert M. Bosch, M.P.H., Minneapolis, Minn.
Sidney S. Chipman, M.D., Chapel Hill, N. C.
Dean A. Clark, M.D., Boston, Mass.
John W. Cronin, M.D., Chevy Chase, Md.
William J. Darby, M.D., Nashville, Tenn.
John H. Dingle, M.D., Cleveland, Ohio
Geoffrey Edsall, M.D., Washington, D. C.
William W. Frye, M.D., New Orleans, La.
Marion I. Murphy, R.N., Minneapolis, Minn.
Georgia B. Perkins, M.D., Denver, Colo.
John J. Phair, M.D., Cincinnati, Ohio
M. Allen Pond, M.P.H., Washington, D. C.
Howard J. Shaughnessy, Ph.D., Chicago, Ill.
Dorothy Wilson, Ed.D., New Haven, Conn.

CHAIRMEN OF STANDING COMMITTEES

Committee on Constitution and By-Laws—Myron E. Wegman, M.D., Washington, D. C.
Committee on Eligibility—John J. Wright, M.D., Chapel Hill, N. C.
Committee on Professional Education—Philip E. Blackerby, Jr., D.D.S., Battle Creek, Mich.

SECTION OFFICERS 1957

Dental Health

Chm., Robert A. Downs, D.D.S., Denver, Colo.
Vice-Chm., John E. Chrietzberg, D.D.S., Atlanta, Ga.
Secy., Donald J. Galagan, D.D.S., Washington, D. C.

Engineering and Sanitation

Chm., Morton S. Hilbert, C.E., Dearborn, Mich.
Vice-Chm., Mark D. Hollis, C.E., Washington, D. C.
Secy., William C. Gibson, Ann Arbor, Mich.

AMERICAN PUBLIC HEALTH ASSOCIATION, Inc.
GOVERNING COUNCIL—Cont.

Epidemiology

Chm., Wendell R. Ames, M.D., Rochester, N. Y.
Vice-Chm., E. Gurney Clark, M.D., New York, N. Y.
Secy., Thomas D. Dublin, M.D., Chevy Chase, Md.

Food and Nutrition

Chm., Robert E. Shank, M.D., Kirkwood, Mo.
Vice-Chm., Frederick C. Baselt, New York, N. Y.
Secy., Helen E. Walsh, Berkeley, Calif.

Health Officers

Chm., Robert N. Barr, M.D., Minneapolis, Minn.
Vice-Chm., Emil E. Palmquist, M.D., Berkeley, Calif.
Secy., Robert E. Coker, Jr., M.D., Chapel Hill, N. C.
Section Council:
Daniel Bergsma, M.D., Trenton, N. J.
J. W. R. Norton, M.D., Raleigh, N. C.
Edwin H. Jorris, M.D., Madison, Wis.
George James, M.D., New York, N. Y.
Henry A. Holle, M.D., Austin, Tex.

Laboratory

Chm., Morris F. Shaffer, D.Phil., New Orleans, La.
Vice-Chm., Howard L. Bodily, Ph.D., Berkeley, Calif.
Secy., Albert V. Hardy, M.D., Jacksonville, Fla.

Maternal and Child Health

Chm., R. Gerald Rice, M.D., Harrisburg, Pa.
Vice-Chm., Alfred Yankauer, M.D., Albany, N. Y.
Secy., Helen M. Wallace, M.D., Minneapolis, Minn.

Medical Care

Chm., Milton I. Roemer, M.D., Teaneck, N. J.
Vice-Chm., Lucille M. Smith, Falls Church, Va.
Secy., Herbert Notkin, M.D., Syracuse, N. Y.

Mental Health

Chm., Paul V. Lemkau, M.D., New York, N. Y.
Vice-Chm., Robert H. Felix, M.D., Bethesda, Md.
Secy., Rema Lapouse, M.D., Kenmore, N. Y.

Occupational Health

Chm., Robert H. Flinn, M.D., Washington, D. C.
Vice-Chm., Herbert T. Walworth, Chicago, Ill.
Secy., Lewis J. Cralley, Ph.D., Cincinatti, Ohio

Public Health Education

Chm., Robert O. Yoho, Indianapolis, Ind.
Vice-Chm., Ralph H. Boatman, Jr., Ph.D., Chicago, Ill.
Secy., Norma Johannis, Denver, Colo.

Public Health Nursing

Chm., Julia D. Smith, R.N., Chapel Hill, N. C.
Vice-Chm., Kathleen M. Leahy, R.N., Seattle, Wash.
Secy., Agnes L. Fuller, R.N., New York, N. Y.

School Health

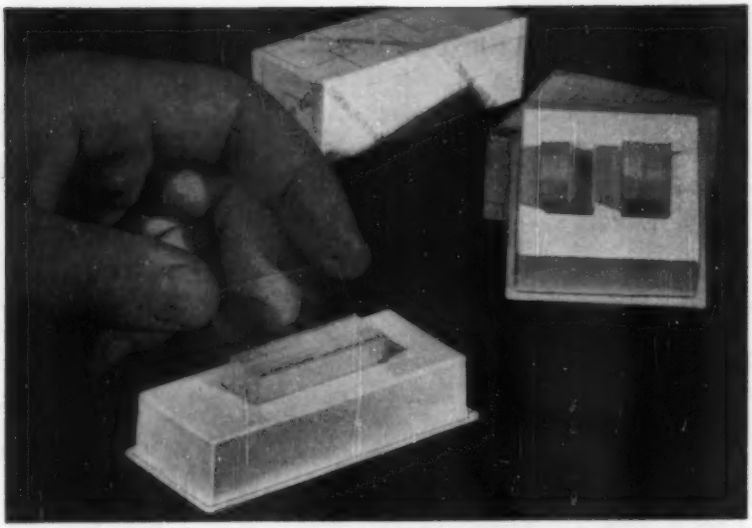
Chm., Edward B. Johns, Ed.D., Los Angeles, Calif.
Vice-Chm., Elena Sliepcevich, D.P.E., Columbus, Ohio
Secy., Florence L. Fogle, R.N., Columbus, Ohio

Statistics

Chm., Bernard G. Greenberg, Ph.D., Chapel Hill, N. C.
Vice-Chm., Howard West, Alexandria, Va.
Secy., Robert D. Grove, Ph.D., Arlington, Va.

Representatives of Affiliated Societies and Branches

Arizona—Lynn J. Lull, M.D.
Arkansas—
California, Northern—David Frost, M.D.
California, Southern—Lenor S. Goerke, M.D.
Colorado—J. Robert Cameron, M.P.H.
Connecticut—Eric W. Mood
Cuba—Guillermo Lage, M.D.
Florida—Wilson T. Sowder, M.D.
Georgia—Ernest G. Eggert
Idaho—Lawrence J. Peterson, M.S.P.H.
Illinois—Leroy L. Fatherree, M.D.
Indiana—
Iowa—Edmund G. Zimmerer, M.D.
Kansas—Dwight F. Metzler
Louisiana—Ben Freedman, M.D.
Massachusetts—Kenneth I. E. Macleod, M.D.
Michigan—Albert E. Heustis, M.D.
Minnesota—Abraham B. Rosenfield, M.D.
Mississippi—Rhea L. Wyatt, M.D.
Missouri—J. Earl Smith, M.D.
Montana—Paul R. Ensign, M.D.
Nebraska—
New Mexico—Myrtle Greenfield
New York City—Arthur Bushel, D.D.S.
New York State—Bosse B. Randle
North Carolina—Everett H. Ellinwood, M.D.
North Dakota—Melvin E. Koons
Ohio—Leo F. Ey
Oklahoma—Margaret F. Shackelford
Oregon—
Pennsylvania—Bernard M. Blum, M.D.
Puerto Rico—Francisca Guerra, D.D.S.
South Carolina—G. S. T. Peeples, M.D.
South Dakota—Herbert A. Hudgins, M.D.
Tennessee—Lloyd M. Graves, M.D.
Texas—Henry E. Drumwright
Utah—Grace C. Nason
Washington State—Bernard Bucove, M.D.
West Virginia—Guy R. Post, M.D.
Wisconsin—Margaret E. Hatfield, M.D.
Southern Branch—Andrew Hedmeg, M.D.
Western Branch—Harold M. Erickson, M.D.



Enjoy using superlatively flat, clear, distortion-free Corning Optical Cover Glasses in all seven thicknesses from this brand new one-at-a-time dispenser pack. One-ounce contents plus no-wrap feature cuts handling time, too.

Corning's new dispenser package gives you clean cover glasses

1 at a time - time after time

We've gone to great lengths to give you the finest optical quality, water-white flat cover glasses available.

Only improvement left for us to make, to make your work with them easier, was the box. We've done something about that, too.

Now, Corning Cover Glasses, the size and shape and thickness you use, come to you in a molded plastic pack with wells to hold the contents. The glasses are packed vertically. You lift one out at a time—touching only the edges, never the flat working surfaces.

The cover glass is clean, ready for use as you take it from the pack. Because there is no cotton or tissue paper cushion needed to hold the glasses in place, there's no lint or dust to remove either.

Ask your Laboratory Supply Dealer to show you the new Corning Cover Glass package. You can include standard sizes and thicknesses of cover glasses as components of multiple-case orders for PYREX brand glassware.

CORNING GLASS WORKS, 80-3 Crystal St., CORNING, N.Y.

Corning means research in Glass

THE PLAIN TRUTH ABOUT PIPERONYL BUTOXIDE

It's one of the most amazing insecticidal synergists to come to light in the laboratory in recent years.

In combination with pyrethrum, *piperonyl butoxide* forms the *versatile* Pyrenone* concentrates — steps up the killing power of pyrethrum at least 10 times. *Butoxide* itself has definite insecticidal properties. Yet it is virtually *non-toxic* to man or warm-blooded animals. It is equally as safe as pyrethrum, if not more so.

STABILIZES PYRETHRUM

Piperonyl butoxide also stabilizes pyrethrum in these two important ways:

1. **Reduces deterioration of pyrethrum by screening out ultra-violet light.**
2. **Acts as an acid acceptor and thus retards decomposition and polymerization of pyrethrum.**

Net result of this two-way stabilizing action is to increase the shelf-life of the end product — and to make it more effective in practical applications against insects for *longer* periods of time.

READILY SOLUBLE

Readily soluble in all common organic solvents, *piperonyl butoxide* is also a solvent in its own right. It minimizes, and often makes unnecessary, the use of other solvents and aromatics which may impart undesirable odors to end products. And because this superior synergist is an ether, *butoxide* is stable to the action of other chemical agents and exposure conditions—such as, heat, light and atmospheric changes.

For complete technical data . . . typical formulations for specific end uses . . . and sample label statements, write the nearest Fairfield Chemical Division office, Food Machinery and Chemical Corporation. Sales Headquarters: 441 Lexington Avenue, New York 17, N. Y. Branches in Principal Cities.

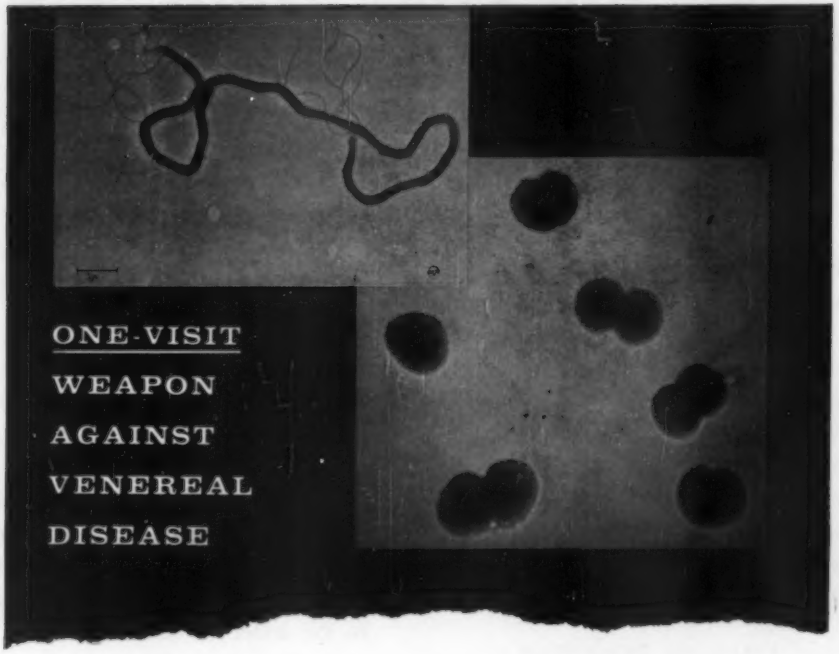
*Reg. U. S. Pat. Off., F.M.C.

Pyrenone

FAIRFIELD CHEMICALS

fmc Chemical Divisions

OHIO-APEX *Plasticizers and Chemicals* WESTVACO CHLOR-ALKALI *Alkalis, Chlorinated Chemicals, Carbon Bisulfide*
FAIRFIELD CHEMICAL *Insecticides and Pesticide Compounds* NIAGARA CHEMICAL *Insecticides, Fungicides and Industrial Sulphur*
BECCO CHEMICAL *Peroxygen Chemicals* WESTVACO MINERAL PRODUCTS *Phosphates, Barium and Magnesium Chemicals*
F. M. C. ORGANIC CHEMICALS *Organic Chemicals*



Injection BICILLIN is a potent weapon against venereal disease because it achieves prolonged penicillemia with a single injection.

To eradicate *primary and early secondary syphilis,* Smith[1] reports that one injection of 2,400,000 units supplies the persistent penicillin levels required for therapeutic efficacy.

And in *acute gonorrheal urethritis,* "... a single dose of 300,000 units intramuscularly is adequate to effect a cure in most cases."[2]

Supplied: Injection BICILLIN, 2,400,000 units, single-dose disposable syringe (4-cc. size); 300,000 units per cc., multiple-dose vial of 10 cc.

1. Smith, C.A., and others: Am. J. Syph., Gonor. & Ven. Dis. *38*:136 (March) 1954. 2. Council on Pharmacy and Chemistry. New and Nonofficial Remedies. J. B. Lippincott Co., Philadelphia, 1955, p. 166.

INJECTION BICILLIN® LONG-ACTING

Benzathine Penicillin G (Dibenzylethylenediamine Dipenicillin G)

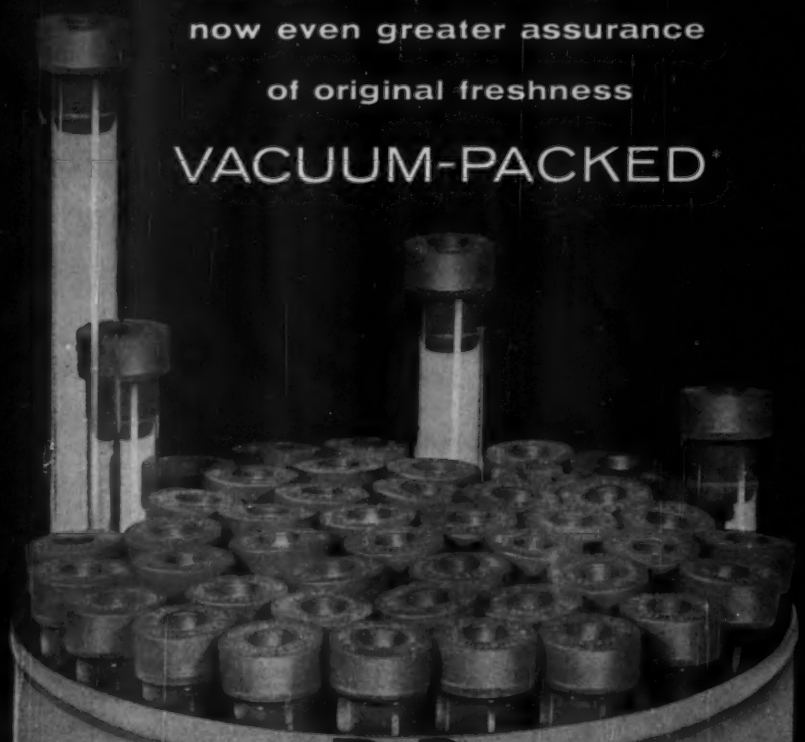
PENICILLIN WITH A SURETY FACTOR

Wyeth®
Philadelphia 1, Pa.

now even greater assurance

of original freshness

VACUUM-PACKED*



B-D VACUTAINER

an evacuated specimen tube

- minimizes oxidation of rubber parts
- assures vacuum-packed freshness through storage control

plus

- ease of storage and convenience of dispensing

clean and efficient—from vein to container to centrifuge without transfer... prevents contamination and spillage.

economical—eliminates costly preparation and cleaning procedures.

A laboratory test is no better than the specimen, and the specimen no better than the manner in which it was collected.

B-D AND VACUTAINER, T. M. REG. U. S. PAT. OFF. 40136

B-D BECTON, DICKINSON AND COMPANY
RUTHERFORD, NEW JERSEY

International's new high-speed angle centrifuge model HT

A fully enclosed table model with speeds up to 17,000 r.p.m.*, forces up to 34,390 G* and capacity of 400 ml.

featuring

Complete Protection for the Operator . . .
Two thicknesses of heavy-gauge steel — guard bowl *plus* cabinet — protect operator from rotating head. Cover of thick plate steel is held securely with rugged hinge and lever lock.

Removable Instrument Panel for Remote Control . . .
Front panel unit, containing all instruments and controls can be removed easily from cabinet and is portable, allowing remote control operation when centrifuge is located in a cold room or chamber.

Complete Instrumentation . . .
Electric Tachometer constantly indicates true operating speed, regardless of line voltage fluctuations.

Ammeter shows current flow for acceleration control.

Automatic Timer shuts off centrifuge at selected time interval. Timer can be eliminated by cutout switch.

Autotransformer gives stepless speed control without heating.

Protective No-Voltage Relay, Pilot Light and Safety Fuse.

Unique Cooling System . . .
A specially designed air circulation system provides maximum cooling of head and bearings.

*Note: speeds are obtained at 115 volts input to centrifuge; force is effective centrifugal force figured at the maximum radius of the material being centrifuged.

Designed for Safe Operation

Centrifuge Inside — Controls Outside the Cold Room or Chamber

WRITE FOR BULLETIN E

International Equipment Co.

1284 SOLDIERS FIELD ROAD • BOSTON 35, MASSACHUSETTS

Chlorine sanitizing products by

OLIN MATHIESON...

For over 30 years, Olin Mathieson has served public health by helping to develop dry chlorine products that add economy, simplicity and convenience to sanitizing operations. Today, in any area where bacteria, fungi, algae or odors are a threat, public health officials will do well to investigate the effective action of Olin Mathieson hypochlorite products in these fields:

WATER SUPPLY
reservoirs and wells
newly-laid pipe lines and mains
pumps, stand pipes and supply equipment
spray ponds, sand filters and basins
algae control
septic tanks
sewage disposal plants

INSTITUTIONAL SANITATION
hotels and theaters
schools
office buildings
apartment houses, hospitals

INDUSTRIAL SANITATION
general plant sanitizing
rest rooms
recirculated water systems
condensers
air conditioning
neutralizing cyanide waste

FOOD PROTECTION
dairies and milk-product plants
meat processing plants
canneries
sugar refineries
sea-food processing
fresh fruit and vegetable processing
beverage plants
restaurants, bars and taverns
hotel dining rooms

SWIMMING POOLS
disinfection of water
decks, walls and walkways
pool cleaning
lockers and toilets
suit and towel sterilization

EMERGENCY CHLORINATION
In case of flood, drought, fire, or power failure, HTH is a readily available source of chlorine.

HTH Granular
Calcium hypochlorite in free-flowing, quick-dissolving, and non-dusty form. Contains 70% available chlorine.

HTH Tablets
Easy-to-handle tablets which dissolve slowly and provide a continuous source of hypochlorite solution over an extended period of time. Contains 70% available chlorine.

HTH-15
Special HTH formulation containing 15% available chlorine.

Lo-Bax Special
Special formulation for dairies and milk-product plants. Contains 50% available chlorine.

LoBax-W
Chlorine with special wetting agent for extra penetration.

For your HTH literature kit containing descriptive folders and booklets covering any of the above uses, write to us today.

MATHIESON CHEMICALS
OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS DIVISION • BALTIMORE 3, MD

HTH® and LO-BAX® are trademarks 4883

NEW KIMBLE

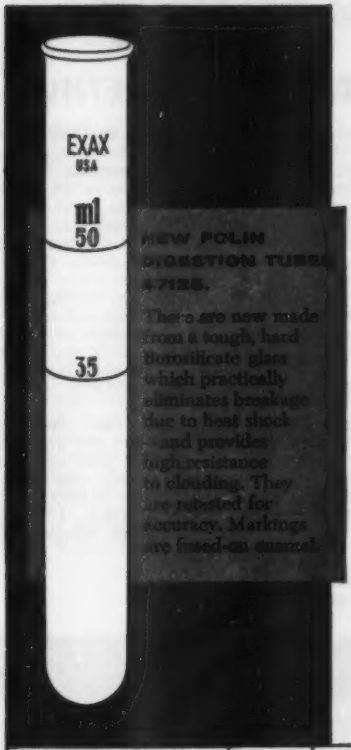
designed for specific needs—longer

KIMBLE LONG TIP PIPETTES. Permit easy manipulation in small openings. 37022 is a measuring style graduated to a base line. 37039 is a blow-out, serological style graduated to the tip. They are made of Borosilicate glass with a high chemical resistance that prevents clouding . . . markings are permanent . . . individually retested for accuracy.

NEW HEMEX BLOOD DILUTING PIPETTES. A *new* line of quality pipettes providing National Bureau of Standards accuracy at *low cost*. Markings are permanent. They can be removed only by dissolving the glass itself. Tubing and mouthpiece are sold separately, for added economy. **#36550 and 36555—11-line for red and white corpuscles. #36560 and #36565—3-line for red and white corpuscles. #36650—Sahli. #36655—tubing and mouthpiece.**

ITEMS

life—greater convenience and economy



✓GRADUATION LINES AND NUMBERS ARE PERMANENT.
The fused-in colored material used in the lines and numbers can be removed only by dissolving the glass itself.

✓GLASS WITH EXCEPTIONAL RESISTANCE TO CLOUDING.
Kimble Borosilicate glass has a higher chemical resistance than any other glass available. This means longer life with sparkling clarity and resultant savings on replacements.

✓ACCURACY INSURED BY RIGID SPECIFICATIONS.

✓THOROUGHLY ANNEALED FOR GREATER STRENGTH.
Proper annealing provides greater mechanical strength.

✓UNIFORMITY OF PRODUCT ASSURED THROUGH QUALITY CONTROL.
Careful control in every manufacturing stage assures product uniformity day in and day out.

DON'T ACCEPT SUBSTITUTES.

If your dealer cannot supply Kimble pipettes and tubes—write: Kimble Glass Company, subsidiary of Owens-Illinois, Toledo 1, Ohio.

Description and Catalog Number	Capacity ml.	Subdivision ml.	Qty. In Case	Description and Catalog Number	Qty. In Case
Mohr Measuring Pipettes 37022 with long tip	0.1	1/100	12	Hemex Blood Diluting Pipettes:	
	0.2	1/100	12		
	0.5	1/100	12	36550—11 line, red	36
	1	1/100	12	36555—11 line, white	36
	2	1/10	12	36560—3 line, red	36
	5	1/10	12	36565—3 line, white	36
Serological Pipettes 37039 with long tip	0.2	1/100	12	36550 -Sahli	36
	1	1/100	12	36655 Rubber Tubing and Mouthpiece	72
	5	1/10	12		
47125 Folin Digestion Tubes	50		36	There is no substitute for Kimble quality.	

KIMBLE LABORATORY GLASSWARE
AN (O) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES • TOLEDO 1, OHIO

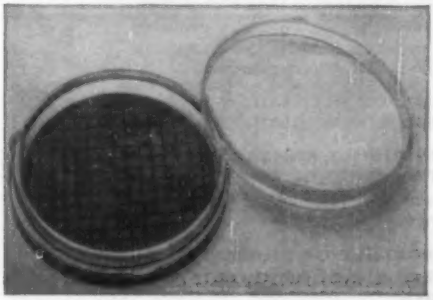
Water Testing

*APPROVED Water Pollution Control Technique

in the Laboratory

with the MILLIPORE FILTER STANDARD METHOD

NOW APPROVED as an alternate Standard Method for coliform testing, the MILLIPORE FILTER technique allows the determination of potable water quality to be carried out more RAPIDLY, more ECONOMICALLY, and with much greater ACCURACY than ever before possible. Results are obtained up to 5 times faster—in 16 to 20 hours—and with 2 to 5 times the precision of present broth tube methods. No tubes to wash, no breakage problems—the MF® technique saves valuable time, saves money, saves space.



MILLIPORE FILTER in Disposable Plastic Petri Dish showing typical Coliform Bacteria Sheen Colonies, indicative of water contamination. MF® incubated for only 18 hours at 35°C.

MILLIPORE FILTERS are conveniently packaged in resealable Kraft envelopes—10 filters and nutrient pads per envelope—ready for immediate autoclave sterilization. Grid-marked to facilitate colony counting, the MF® may be readily filed as a permanent record of test results.

REGULATIONS SENSIBLY REQUIRE THAT PARALLEL TESTING OF THE MF® TECHNIQUE AND PRESENT METHODS be conducted in each laboratory to assure results of equivalent sanitary significance before adopting the new Standard Method. Full details on establishing MILLIPORE FILTER techniques in your laboratory are immediately available upon request.

Write for a copy of the new color-illustrated booklet,
"The MILLIPORE FILTER Standard Method of Water Bacteriology."

WATER TESTING IN THE LABORATORY — IN EIGHT STEPS

1. Media prepared.

2. Filters autoclaved.

3. Approximately 2 ml of medium added to pad.

4. Filter placed on holder.

5. Funnel clamped.

6. Sample poured and vacuum applied.

7. Filter "rolled" onto pad. Avoid trapping air between filter and pad.

8. Dishes covered and incubated 20 hours in inverted position.

MILLIPORE FILTER CORPORATION

36 PLEASANT STREET, WATERTOWN 72, MASSACHUSETTS, U.S.A.

MF® Water Testing

*APPROVED Water Pollution Control Technique

in the Field

with the MILLIPORE FIELD MONITORING KIT

EMPLOYING THE BASIC MILLIPORE FILTER TECHNIQUE, now approved as an alternate Standard Method for coliform testing, the FIELD MONITORING KIT yields accurate, direct field determinations of the bacterial content of waters in 18 to 20 hours. Used in conjunction with the Millipore Field Incubator, the FIELD MONITORING KIT is particularly adapted for use in rural areas or under disaster conditions where laboratory facilities are unavailable. In use by the World Health Organization, the FIELD MONITOR has also been recommended by the U. S. Navy for use by its Preventive Medicine Units.

SUPPLIED STERILE and ready for use, the FIELD MONITORING KIT contains two disposable plastic Monitor units which serve as combination filter holders and culturing dishes, two ampules of liquid nutrient medium, and two plastic sampling tubes. The Kit is packaged in a convenient mailing box to allow easy shipment if desired.

THE FIELD MONITORING KIT allows the sampling of large volumes of water, eliminates the cost and inconvenience of sample shipments in glass bottles, and requires no laboratory facilities. It is FAST, ACCURATE, REPRODUCIBLE AND ECONOMICAL.

FIELD MONITOR top removed to show Coliform Bacteria Sheen Colonies developed on the MF® surface after 18 hours of incubation.

Write for a copy of the new color-illustrated booklet, "The MILLIPORE FILTER Standard Method of Water Bacteriology."

WATER TESTING IN THE FIELD — IN EIGHT STEPS

1. Cup thoroughly rinsed.
2. Sample drawn through Monitor in inverted position.
5. Ampul top broken — ampul lifted slightly.
6. Media drawn through Monitor with syringe. STOP THE INSTANT
7. Replace caps.

MILLIPORE FILTER CORPORATION

36 PLEASANT STREET, WATERTOWN 72, MASSACHUSETTS, U.S.A.

*Color illustrated booklet available.

added certainty in antibiotic therapy

—particularly for that 90% of the patient population treated in home or office where sensitivity testing may not be practical . . .

for your entire patient population

multi-spectrum†

Sigmam

100% EFFECTIVE in respiratory infections including the 25% due to resistant staphylococci.[1-3]

97% EFFECTIVE in dermatologic and mixed soft tissue infections including the 22% resistant to one or more antibiotics.[3-6]

84.6% EFFECTIVE in genitourinary infections including the 61% resistant to other antibiotic therapy.[2,5]

93% EFFECTIVE in diverse infections including the 21% due to resistant pathogens.[1,5]

98.7% EFFECTIVE in tropical infections including those complicated by heavy bacterial contamination or multiple parasitisms.[7]

†the antimicrobial spectrum of tetracycline extended and potentiated with oleandomycin (Matromycin®) to combat resistant strains of pathogens—particularly resistant staphylococci—and to delay or prevent the emergence of new antibiotic-resistant strains.

1. Carter, C. H., and Maley, M. C.: Antibiotics Annual 1956-1957, New York, Medical Encyclopedia, Inc., 1957, p. 51. 2. Shalowitz, M., and Sarnoff, H. S.: Personal communication. 3. Shubin, M.: Personal communication. 4. La Caille, R. A., and Prigot, A.: Antibiotics Annual 1956-1957, New York, Medical Encyclopedia, Inc., 1957, p. 67. 5. Winton, S. S., and Cheserow, E.: Antibiotics Annual 1956-1957, New York, Medical Encyclopedia, Inc., 1957, p. 55. 6. Cornbleet, T.: Personal communication. 7. Loughlin, E. H.; Mullin, W. G.; Alcinder, L., and Joseph, A. A.: Antibiotics Annual 1956-1957, New York, Medical Encyclopedia, Inc., 1957, p. 63.

SUPPLY
CAPSULES: 250 mg. (oleandomycin 83 mg., tetracycline 167 mg.). Bottles of 16 and 100.
new mint-flavored ORAL SUSPENSION: 1.5 Gm., 125 mg. per 5 cc. teaspoonful (oleandomycin 42 mg., tetracycline 83 mg.) 2 oz. bottle.

Pfizer

PFIZER LABORATORIES, *Division, Chas. Pfizer & Co., Inc.*, Brooklyn 6, N. Y.
World leader in antibiotic development and production

JUST A REMINDER ...
that a product doesn't have to be NEW to be modern. BryKo ... Pennsalt's liquid cleaner ... has withstood the acid test of time and still stands alone. We thought you might like to see this ad that's being run in milk producers' publications. If you want further, detailed information on BryKo, please write for descriptive literature.

the
new word
for
easy, effective
cleaning...
BryKo
clean!
BryKo is fast! Cuts milk film . . . softens milkstone, easily, quickly.
BryKo is safe! Safe on metal . . . safe on rubber . . . mild on hands.
BryKo is efficient! Plenty of suds, good cleaning action, no lime build-up even with hard water.
BryKo is economical! Saves money and time. ONLY one tablespoon makes three gallons of powerful cleaning solution.
BryKo . . .
the modern
liquid cleaner
Order liquid BryKo from your dealer. Write for free booklet. B-K Dept. 380, Pennsylvania Salt Manufacturing Company, Three Penn Center Plaza, Philadelphia 2, Pa.
Pennsalt Chemicals
BryKo is a trade-mark of Pennsylvania Salt Manufacturing Company

new high values for frozen citrus

Recent assays by the Wisconsin Alumni Research Foundation[1] reveal frozen citrus juices significantly higher in vitamin C than shown by the latest U.S.D.A. Handbook (No. 8, 1950), with orange juice averaging 20% higher... further proof it is the "nutritive equal"[2] of fresh juice. Recommended Daily Allowances for vitamin C as provided by frozen citrus juices are shown below.

	Reconstituted frozen orange juice	Reconstituted frozen grapefruit juice
75 mg.—normal adults	5 fl. oz.	6½ fl. oz.
100 mg.—late adolescence or pregnancy	7 fl. oz.	8½ fl. oz.
30 mg.—infants to 1 year of age	4¼ tablespoonfuls	

Florida Citrus Commission, *Lakeland, Florida*

1. J. Agr. & Food Chem. 4:418, 1956.

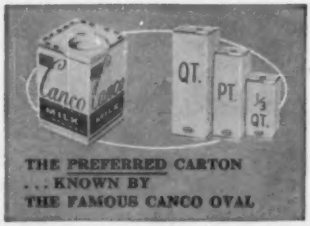
2. A.M.A., Council on Foods & Nutrition: J.A.M.A. 146:35, 1951.

. . . because even the youngest pupils can open them—unassisted!

The teacher who supervises an elementary class welcomes the Canco carton. She knows the youngest student can open it easily himself, and pour or drink from it without spilling.

In fact, this superior carton has features that make it everyone's favorite—cafeteria managers, vendors, factory workers, housewives, grocers. It's easier to open and close, provides "controlled pouring," is compact, sturdy, sanitary.

As a public health official, you can take pride in the fact that milk is now available almost everywhere in convenient disposable milk containers. For health officials recognized early that the single service paper milk container is one of the great milestones on the road to better milk distribution.



AMERICAN CAN CANCO COMPANY

NEW YORK · CHICAGO · SAN FRANCISCO

for microprojection with finer detail . . . more brilliance

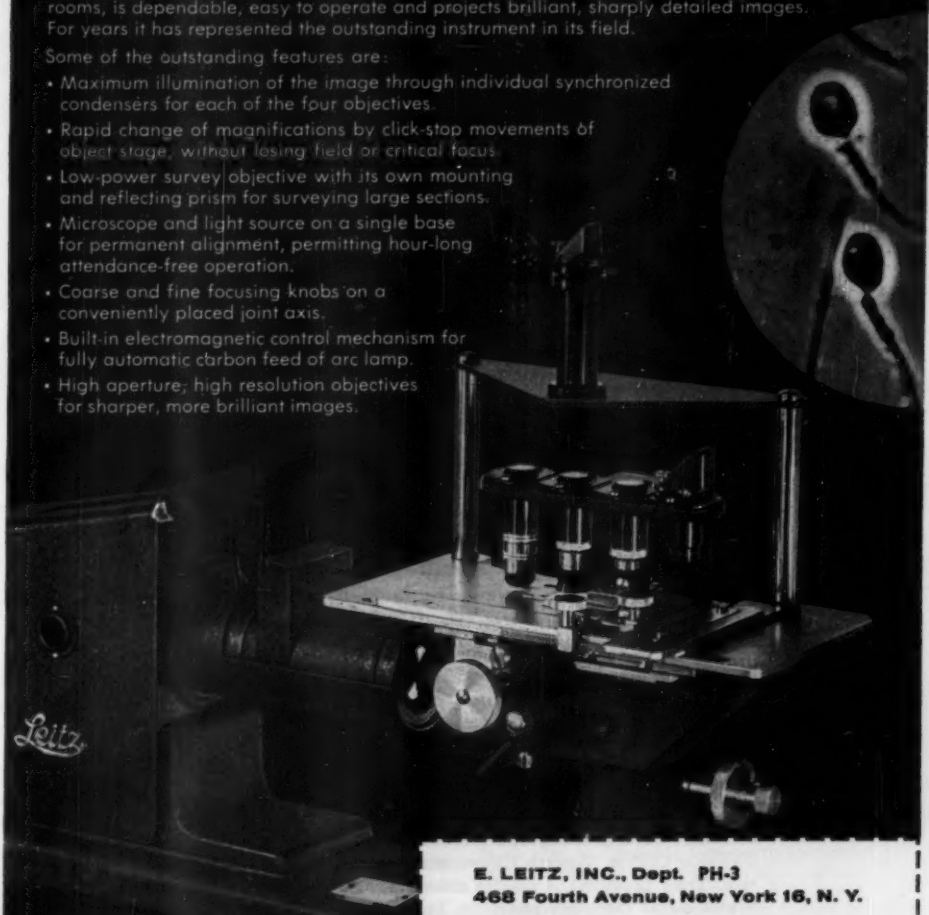
Leitz **MICROPROJECTOR**

model XI C

You will find that the versatile Leitz *MICROPROJECTOR*, suitable to either large or small rooms, is dependable, easy to operate and projects brilliant, sharply detailed images. For years it has represented the outstanding instrument in its field.

Some of the outstanding features are:

- Maximum illumination of the image through individual synchronized condensers for each of the four objectives.
- Rapid change of magnifications by click-stop movements of object stage, without losing field or critical focus.
- Low-power survey objective with its own mounting and reflecting prism for surveying large sections.
- Microscope and light source on a single base for permanent alignment, permitting hour-long attendance-free operation.
- Coarse and fine focusing knobs on a conveniently placed joint axis.
- Built-in electromagnetic control mechanism for fully automatic carbon feed of arc lamp.
- High aperture, high resolution objectives for sharper, more brilliant images.



E. LEITZ, INC., Dept. PH-3
468 Fourth Avenue, New York 16, N. Y.

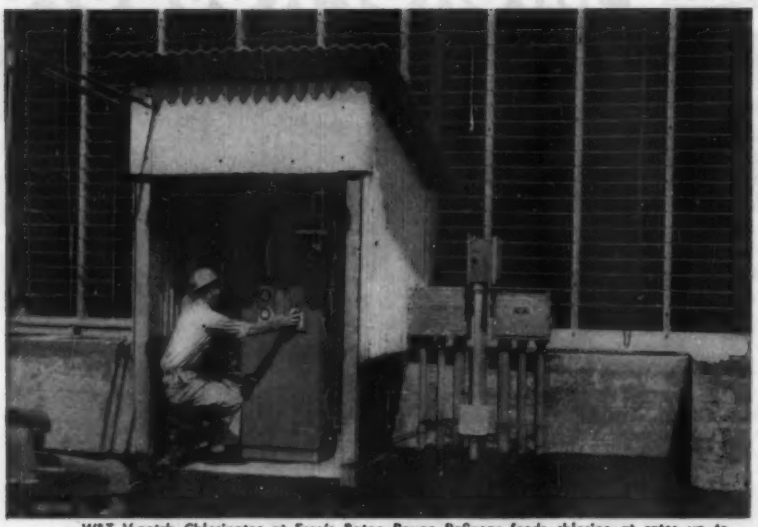
Please send me your brochure on the Leitz *MICROPROJECTOR*.

Name_____

Street_____

City_____ Zone_____ State_____

E. LEITZ, INC., 468 FOURTH AVENUE, NEW YORK 16, N. Y.
Distributors of the world-famous products of Ernst Leitz, Wetzlar, Germany
LENSES • CAMERAS • MICROSCOPES • BINOCULARS



W&T V-notch Chlorinator at Esso's Baton Rouge Refinery feeds chlorine at rates up to 500 lbs./24 hr. over a 10 to 1 feed range. Other V-notch models are available with maximum capacities from 500 to 2000 lbs./24 hr. over a 20 to 1 feed range.

NEW W&T V-NOTCH CHLORINATORS,

are rugged—easy to operate —moderately priced

The W&T V-notch Chlorinator installed at the Esso Standard Oil Co. Refinery, Baton Rouge, La. is housed in a shed open to the sun, weather, and water spray drifting from a cooling tower. The average water or sewage treatment plant operator would consider this rugged service for any piece of equipment.

W&T V-notch Chlorinators have proven in this and other installations that they can withstand rugged service. The design of new V-notch Chlorinators uses not only modern corrosion proof materials but a new concept of chlorine gas control, the W&T V-notch Variable Orifice. V-notch Chlorinators are easy to operate and maintain. They provide the precise chlorine control that is expected from Wallace and Tiernan equipment. In addition, W&T V-notch Chlorinators are an attractive piece of equipment, colored soft green to fit into plant color schemes.

Ask your local W&T representative for more information about W&T V-notch Chlorinators or send for Bulletin S-114.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

American Journal of
PUBLIC HEALTH
and the Nation's Health
Official Monthly Publication of the American Public Health Association, Inc.
Volume 47 March, 1957 Number 3

Measles Virus: A Summary of Experiments Concerned with Isolation, Properties, and Behavior

JOHN F. ENDERS, Ph.D., F.A.P.H.A.; THOMAS C. PEEBLES, M.D.; KEVIN McCARTHY, M.D.; MILAN MILOVANOVIĆ, M.D.; ANNA MITUS, M.R.C.P.; and ANN HOLLOWAY

Presented here is a clarifying summarization of the many studies upon which any forthcoming advances in measles prophylaxis will be based.

Study of the etiologic agent of measles began with Home at the end of the 18th century and has been continued intermittently until the present. Among the more significant contributions to this subject in modern times was the demonstration by Goldberger and Anderson [1] in 1911 that macaque monkeys are susceptible to infection. This observation was later confirmed and extended by Blake and Trask,[2] among others. During the course of these earlier studies evidence for the filterable nature of the agent was obtained.

Using the monkey to test for the presence of virus, Plotz [3] in the 1930's reported its successful cultivation in cultures of chick embryonic tissues. In 1939–1940 Rake and Shaffer [4, 5] described the serial propagation of the agent in chick embryos and in 1941 with Jones [6] confirmed Plotz's observations. In the same year Shaffer and his associates [7] also noted that during the course

Dr. Enders is chief; Dr. Milovanović is research associate (on leave of absence, Institute of Hygiene, Belgrade, Yugoslavia); and Miss Holloway is research assistant, Research Division of Infectious Diseases, The Children's Medical Center; Dr. Peebles is assistant in pediatrics, Harvard Medical School, Boston, Mass. Dr. McCarthy is lecturer in bacteriology, University Department of Bacteriology, University of Liverpool, England. Miss Mitus is research fellow, Tumor Therapy Service of Children's Cancer Research Foundation, Boston, Mass.

This paper was presented before a Joint Session of the Epidemiology and Laboratory Sections of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 13, 1956.

The investigations summarized in this paper were conducted under the sponsorship of the Commission on Viral Infections of the Armed Forces Epidemiological Board and supported by the Office of the Surgeon General, Department of the Army.

of passages in the chick embryo the virulence of the virus for man was reduced and they attempted to determine whether this attenuated virus might be employed as a vaccine. The results were inconclusive and since that time we have seen no account of further trials with such materials, although it is our understanding that similar experiments are now in progress within the Soviet Union.[7a] Other workers in the past,[8] including one of us, were not able to induce measles in the monkey with regularity and also failed to obtain convincing evidence that the virus multiplied in living chick embryos or in chick embryonic tissues cultivated in vitro.

Such experimental discrepancies as well as the failure to make more rapid progress toward the precise definition of the nature and properties of the measles agent were largely attributable to the lack of a convenient and inexpensive technic whereby viral multiplication could be unequivocally determined. Following the demonstration of the growth and cytopathogenic effect of poliomyelitis virus in cultures of extraneural human tissues it seemed likely that application of the same method might prove effective in the case of measles virus.

Isolation of Measles Virus in Tissue Culture

Accordingly, Enders and Peebles [9] in 1954 undertook experiments in which cultures of human postnatal tissues in roller tube cultures were exposed to whole blood and throat washings obtained from a patient with measles during the first 24 hours of the exanthem. After an interval of from four to 10 days abnormal changes were observed of a character that we shall presently describe and which were shown to be induced by a virus. Comparable materials from seven other typical cases of measles subsequently tested in cultures of human renal or monkey (rhesus) renal cells have yielded agents exhibiting the same cytopathogenic properties. In three of these cases virus was demonstrated in both blood and throat washings; in two the blood was positive and washings were negative. In each of the two remaining cases in which only blood or throat washings was tested virus was also found. In addition, an agent was recovered in tissue culture from the lung of a patient dying during the acute stage of measles that was indistinguishable from the others. It is to be emphasized that these nine viruses were isolated from cases occurring in different geographic areas at two different times, i.e., in the spring of 1954 and 1955. The association with measles of viruses conforming in their characteristics with those we have isolated has been subsequently reported by Cohen and his co-workers [10] and by Ruckle.[11]

Cytopathogenic Properties of the Virus

Upon isolation and during serial passages in cultures of human renal cells our nine strains of virus have induced the formation of syncytia or multinu-

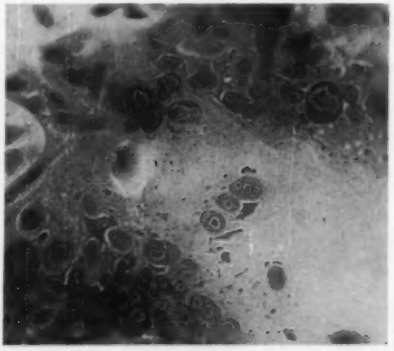


Figure 1—Syncytium or Multinuclear Giant Cell in Culture of Postnatal Human Renal Cells; 16 Days After Addition of 23rd Renal Cell Passage of Edmonston Strain of Measles Virus. H and E Stain x 430

clear giant cells within the sheet of normal epithelial elements such as those shown in Figure 1. Gradually all or nearly all the cells become involved in the process and eventually are destroyed. Several days after the syncytia are apparent, eosinophilic inclusion bodies appear in most of the nuclei and irregular masses of eosinophilic material accumulate in the cytoplasm. Examination of many preparations has convinced us that both these abnormalities are the result of viral multiplication.

When virus that has been propagated in renal cells is introduced into cultures of certain other cells essentially the same cytopathogenic effects are observed at least during a limited number of passages. In Figure 2 are shown the changes that occurred 16 days after inoculation into human amnion of the so-called Edmonston strain of virus. The agent had been previously passed 23 times in cultures of human renal cells. Following the addition of this strain to cultures of the KB line of human carcinoma cells (developed by Eagle) Dekking and McCarthy [12] in our laboratory observed the formation of multinuclear giant cells. Black and his co-workers [13] have described similar changes in cultures of the Hep-2 line of human carcinoma cells. McCarthy [14] and Rustigian [15] independently have noted the same effect in cultures of HeLa carcinoma cells. In unpublished experiments we have demonstrated the growth of virus in the Detroit 6 line of cells that Berman and Stulberg derived from human bone marrow, but we have not noted the formation of syncytia, although in stained preparations intranuclear inclusion bodies were conspicuous in individual cells. We have also seen cells of abnormal appearance in cultures consisting predominantly of human embryonic fibroblasts that were accompanied by multiplication of the virus within the system. So far we have observed no cytopathogenic effects in cultures of bovine amnion cells, chick amnion, or chorioallantoic tissues, or in chick embryonic tissues to which the virus was added.

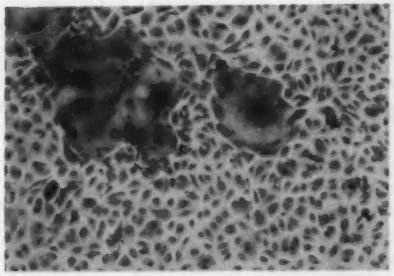


Figure 2—Formation of Syncytia in Culture of Human Amnion Cells Inoculated 16 Days Earlier with Edmonston Strain, from 24th Human Renal Cell Passage. Note Normal Appearance of Surrounding Epithelial Cells. H and E x 160

Lately we have found that after prolonged cultivation, in vitro, the cytopathogenic properties of the virus may become altered. Thus the Edmonston strain after 23 passages in human renal cells has been continuously propagated in human amnion cells. During the 14th amnion cell passage, in addition to the presence of multinuclear giant cells, increasing numbers of refractile, fusiform, or stellate cells were noted that somewhat resembled fibroblasts. Their appearance in the 19th passage is shown in Figure 3 along with typical giant cells. In successive passages these forms tended to predominate or, indeed, in certain cultures came to represent the only manifestation of viral multiplication. In stained preparations intranuclear inclusions were often found in these affected cells. This newly recognized cytopathogenic effect is of much interest from the general biological standpoint: it also led us to attempt again the cultivation of the virus in chick embryos. Later we shall summarize the results of these experiments.

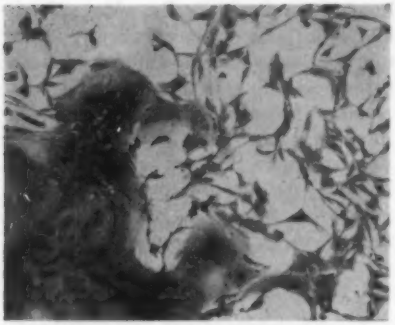


Figure 3—Cytopathogenic Effects in Human Amnion Cells of Edmonston Strain After 23 Passages in Human Renal Cells and 19 Passages in Human Amnion Cells. Note Numerous Fusiform Cells Together with Syncytia. H and E x 150

Serological Reactions

Tests for Virus-Neutralizing Antibodies—Tests of the capacity of acute and convalescent phase sera from 12 measles patients to prevent the cytopathogenic effects of the virus have been carried out using 100 ID_{50} of virus and dilutions of serum increasing by a factor of two. The results have clearly shown that antibodies develop during the course of the disease that prevent the occurrence of both types of cytopathic change in cultures of human renal and amnion cells.[16, 19] Thus in the acute phase sera of six of these 12 patients no neutralizing effect was found in the lowest dilutions of serum tested, i.e., 1:2–1:8. The mean of the convalescent phase serum titers was 1:260 with a range from 1:160 to 1:512. The antibody emerges soon after the exanthem is declared and may attain a moderate or high level within the following seven to 10 days or even earlier as appeared to be the case in the remaining six cases that were studied. Investigation of the persistence of the neutralizing antibody over prolonged periods has not been undertaken, but it can be stated that in a few cases the high concentrations developed early in convalescence are maintained for at least two to four months.

Tests for Complement-Fixing Antibodies—More extensive data on the formation of antibody during the disease have been obtained by means of the complement-fixation test, since this procedure can be carried out with greater convenience and rapidity. As antigen we have used the fluid removed from cultures of human renal or amnion cells two or three weeks after infection with the virus. By means of the drop technic of Fulton and Dumbell 25 pairs of acute and convalescent-phase serum from patients with measles have been tested.[16, 17] In all cases development of antibody or an increase in its initial concentration was demonstrated. The mean increase for these 25 cases was at least 30-fold. In seven instances the first specimen of serum was either taken several days after the onset when an elevated titer was recorded or the end point of the convalescent-phase specimen was not obtained. Excluding these, the mean acute phase serum titer of the remaining 18 cases was less than 1:4 (range: $<$ 1:2 to 1:8). In contrast the mean convalescent phase serum titer was 1:160 with a range from 1:32 to 1:512. These results, similar to those of the neutralization tests, not only afford strong evidence for the etiologic role of the virus in measles, but also suggest that the complement-fixation test should provide a practical diagnostic procedure.

Further evidence for the relationship of the virus to measles was obtained by comparing the results of complement-fixation tests on the sera of persons with either a positive or negative history of the disease.[17] In this study most of the subjects were children under the age of 10 years. The results are summarized in Table 1. It is clear that in a group of 54 persons giving a positive history the proportion with titers exceeding 1:8 is about six times greater than among

Table 1—Correlation of History of Measles with Results of Complement-Fixation Tests

History Positive			History Negative		
CF Titer *	No.	Per cent	CF Titer	No.	Per cent
<4	8	15	<4	12	48
4–8	6	10	4–8	10	40
>8	40	75	>8	3	12

* Reciprocal of initial dilution of serum giving fixation in presence of two units each of antigen and complement.

the group of 25 with negative history. Although the numbers in the groups are not equal, this difference is clearly significant. The relatively large proportion of sera giving positive tests in dilutions four to eight from the group with negative history suggests that in this range nonspecific reactions may often occur.

Pathogenicity of Virus for Monkeys

The results of experiments in susceptible cynomologus monkeys have indicated that two of the strains of virus tested after cultivation, in vitro, are capable of producing a mild disease comparable in most respects to measles in man.[16, 18] The criteria for determining the susceptibility of monkeys will be subsequently discussed. When animals were inoculated by both the intravenous and intranasal routes with virus of the first, second, and 23rd tissue culture passages several phenomena were noted. Viremia was established beginning on the fourth or fifth day and continuing thereafter for two to five days. An exanthem appeared soon after the beginning of the viremic phase which extended over the thorax and abdomen and was especially prominent in the axillary and inguinal regions. Slight to moderate leucopemia developed that was maximal on the ninth day. Shortly after the period of exanthem, i.e., about two weeks after inoculation of the virus, specific complement-fixing antibodies appeared in the blood and soon attained maximal concentrations. These high levels were maintained for several weeks when they usually began to diminish. Antibodies, however, were detectable in significant amounts at least eight months after inoculation of the virus. Not all these phenomena were apparent in other animals that were inoculated at the same time with portions of the same preparation of virus. In one monkey no exanthem was seen, although viremia and antibody response were comparable to those of animals exhibiting a rash; another responded only by the development of a slight leucopemia and the production of antibody. It is evident, then, that susceptible monkeys may vary considerably in their reaction to infection with this agent.

We have emphasized the fact that only susceptible animals may be expected to react in these various ways because early in our work [17] we found that a majority of normal rhesus and cynomologus monkeys that had been held for some time in three laboratories in this country possessed complement-fixing antibodies for the measles agent. In these tests the sera of 16 rhesus and eight cynomologus monkeys were examined. Antibody was found in 14 of the rhesus sera and in all the cynomologus sera. Neutralizing antibody was also detected in the few specimens that were tested. Ruckle [11] has lately reported similar findings and in addition has isolated an agent from monkey kidney tissue that so far is indistinguishable from human measles virus. The problem, however, of the origin of the agent responsible for the presence of these antibodies in apparently normal monkeys has not yet been solved. We are inclined to believe, for reasons that have been discussed elsewhere at length,[18] that it is probably identical with human measles virus and is derived either di-

rectly or indirectly from cases of the disease in man. The most cogent evidence in favor of this view lies in the fact that no complement-fixing antibodies capable of reacting with the Edmonston strain of virus were found in the sera of 31 cynomologus monkeys bled soon after their capture in the forests of Malaya and the Philippines. However this may be, it is obvious that the presence of antibodies reacting with measles virus in laboratory monkeys probably accounts for the discrepant results obtained by past workers in attempts to reproduce the disease in these animals.

Multiplication of the Virus in Chick Embryos

We referred at the beginning to the uncertainty that has continued respecting the capacity of measles virus to multiply in the developing chick embryo. Accordingly, after the means of isolating the agent and assaying its infectivity in tissue culture had been established, we proceeded to determine whether certain of our nine strains could be propagated in this host. Five of these strains maintained in renal cells since their isolation have been tested. The various routes of inoculation included the amniotic and yolk sacs and the chorioallantoic membrane. An incubation period of from four to six days was adopted following the procedure of Rake and Shaffer.[5] In our experiments two or three egg passages were made in the case of each strain and tests for the presence of virus in embryonic materials were carried out in cultures of human renal cells. In no instance was evidence of viral multiplication obtained.

Subsequently, when the variation in cytopathogenic properties of the Edmonston strain occurred, the possibility arose that this change might be accompanied by an alteration in the capacity of the virus to multiply in the chick embryo. A series of egg passages was therefore initiated. The inoculum consisted of virus from the 28th passage in human amnion cell and was introduced into the amniotic sac of the chick embryo. This route was selected with the thought that virus adapted to growth in human amnion cells might more readily proliferate in the analogous cells of the developing chick. After inoculation the embryos were incubated for nine days at 35° C—a longer period than previously allowed. The inoculum used as routine in subsequent egg passages consisted of amniotic fluid. In collateral passage lines suspensions of amniotic and chorioallantoic membranes mixed with the corresponding fluid were also employed. In each passage after the first the concentration of virus in various embryonic constituents was determined by titration in cultures of human amnion cells. The agent has now been maintained throughout seven serial passages. It continues to induce the formation of fusiform and stellate cells when transferred to cultures of human amnion cells (see Figures 4 and 5). In each of the last four passages multiplication was demonstrated by the titrational data. For example, the mean number of 50 per cent tissue culture infecting doses intro-

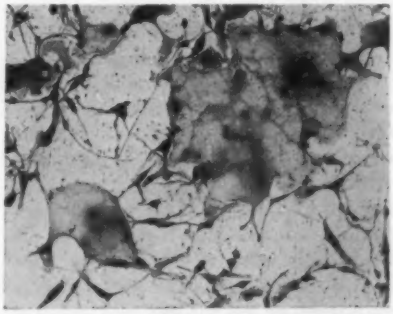


Figure 4—Effect of Edmonston Strain from Third Chick Embryo Passage in Human Amnion Cells, 14 Days After Inoculation of Virus. H and E x 180. Note Fusiform Cells and Syncytium

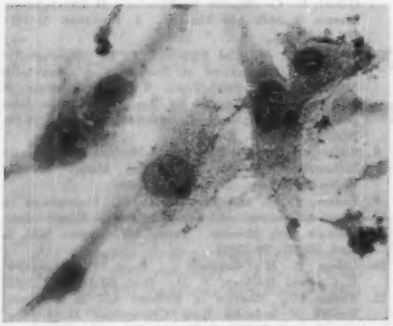


Figure 5—Cells from Same Culture Shown in Figure 4 x 750. Note Inclusion Bodies in Fusiform Cells

duced in the amniotic fluid employed as inoculum was 16, whereas on the average about 2,000 TC ID_{50} per 0.1 ml were found in the amniotic membrane at the time of harvest. The identity of the agent recovered from the fourth egg passage was confirmed in neutralization tests using human and monkey acute and convalescent phase sera as well as in complement-fixation tests in which the antigen consisted of fluid from infected human amnion cell cultures inoculated with the egg-passaged virus. A complete account of these experiments is in preparation.[19]

When it was found that multiplication of this strain occurred in the developing chick it obviously became of interest to determine whether it could be cultivated in cultures of chick embryonic tissues. Experiments of this sort are now in progress and the results so far suggest that multiplication does occur under these conditions.

Discussion

In conclusion, we shall offer brief comment on the results of the investigations that have here been summarized. We believe that they have provided tools whereby the virus can be readily isolated, its infectivity accurately determined, and its pathogenic, immunogenic, and other biologic properties analyzed. Using these tools progress already has been made toward the elucidation of certain long-standing problems, such as the cause of variation in the natural resistance of monkeys and the question of the susceptibility of the chick embryo. Among others that remain to be explored is the nature of the relationship of the virus to postmeasles encephalitis, determination of the true incidence of inapparent infection and of second attacks of measles, the duration of immunity as indicated by the persistence of antibody in the blood, and the determination of whether dermal hypersensitivity to the virus develops after infection.

From the more immediate, practical standpoint it is evident that methods of directly assaying the antibody content of different preparations of gamma globulin or other materials used in the production of passive immunity are already at hand.[16, 17] It also seems that groundwork has been established for future studies directed toward the development of vaccines whether composed of attenuated or inactive virus. We are encouraged to believe that progress toward this objective was made when we succeeded in propagating the agent in chick embryos. In our opinion virus grown under these conditions or in cultures of chick tissue would represent the most suitable material for the preparation of vaccine. There is a potential risk in employing cultures of primate cells for the production of vaccines composed of attenuated virus, since the presence of other agents possibly latent in primate tissues cannot be definitely excluded by any known method. For the preparation of inactive virus vaccine chick embryonic tissue would also appear to be advantageous. Not only would it afford relative assurance of the absence of extraneous viruses in the starting material, but also greatly reduce the cost of manufacture.

Much investigation, however, will be necessary before such considerations become of major importance, since first it must be determined whether multiplication of the virus in chick tissue will continue indefinitely, whether sufficient viral antigen is produced under these circumstances to be immunogenic when inactivated, or whether attenuation of pathogenicity for monkey and man may occur as a result of passage in chick tissue. All these questions future investigation must answer.

REFERENCES

1. Goldberger, J., and Anderson, J. F. An Experimental Demonstration of the Presence of the Virus of Measles in the Mixed Buccal and Nasal Secretions. J.A.M.A. 57:476–478, 1911.
2. Blake, F. G., and Trask, J. D. Studies on Measles. II Symptomatology and Pathology in Monkeys Experimentally Infected. J. Exper. Med. 33:413–422, 1921.
3. Plotz, H. Culture "in vitro" du virus de la rougeole. Bull. Acad. de méd., Paris 119:596–601, 1938.
4. Rake, G., and Shaffer, M. F. Propagation of the Agent of Measles in Fertile Hen's Egg. Nature 144:672–673, 1939.
5. Rake, G., and Shaffer, M. F. Studies on Measles I. The Use of the Chorio-Allantois of the Developing Chick Embryo. J. Immunol. 38:177–200, 1940.
6. Rake, G.; Shaffer, M. F.; and Jones, H. P. Studies on Measles. III The Use of Tissue Culture in Propagation of Measles Virus. J. Infect. Dis. 69: 65–69, 1941.
7. Shaffer, M. F.; Rake, G.; Stokes, J., Jr.; and O'Neil, G. C. Studies on Measles. II Experimental Disease in Man and Monkey. J. Immunol. 41:241–257, 1941.

7a. Zhdanov, V. M., and Fadeyeva, L. L. Experimental Data and Observations of Persons Vaccinated with Antimeasles Allantois—Tissue Vaccine. Program of XIII All-Union Congress of Hygienists, Epidemiologists, Microbiologists, and Infectionists. June 20–28, 1956. Leningrad, Russia.

8. Enders, J. F. The Etiology of Measles in Virus and Rickettsial Diseases. Cambridge, Mass.: Harvard University Press. 1940, pp. 237–267.
9. Enders, J. F., and Peebles, T. C. Propagation in Tissue Cultures of Cytopathogenic Agents from Patients with Measles. Proc. Soc. Exper. Biol. & Med. 86:277–286, 1954.
10. Cohen, S. M.; Gordon, I.; Rapp, F.; Macaulay, J. C.; and Buckley, S. M. Ibid. 90:118–122, 1955.
11. Ruckle, G. Measles in Humans and in Monkeys: Report of Isolation from Cynomolgus Monkeys of an Agent Immunologically Related to Human Measles Virus. Federation Proc. 15:610, 1956.
12. Dekking, F., and McCarthy, K. Propagation of Measles Virus in Human Carcinoma Cells. Proc. Soc. Exper. Biol. & Med. 93:1–2, 1956.
13. Black, F. L.; Reissig, M.; and Melnick, J. L. Propagation of Measles Virus in a Strain of Human Epidermoid Cancer Cells (Hep-2). Ibid. 93:107–108, 1956.
14. McCarthy, K. Unpublished data.
15. Rustigian, R. Personal communication to the authors.
16. Enders, J. F. Observations on Certain Viruses Causing Exanthematous Disease in Man. Am. J. M. Sc. 231:622–637, 1956.
17. ————. Recent Observations on the Behavior in Tissue Culture of Certain Viruses Pathogenic for Man. Fourth R. E. Dyer Lecture (1954). Public Health Service Publication No. 467. Washington, D. C.: Gov. Ptg. Office.
18. Peebles, T. C.; McCarthy, K.; Enders, J. F.; and Holloway, A. J. Immunol. (In press.)
19. Milovanović, M.; Enders, J. F.; and Mitus, A. To be published.)

Mental Health Week Begins April 28

Mental Health Week has been scheduled for the week of April 28. As in the past the National Association for Mental Health is directing this nation-wide observance in cosponsorship with the National Institute of Mental Health, Public Health Service. The week of concentrated attention to mental health problems is designed to get year-round and concerted public support for the care, treatment, and understanding that the mentally ill require in order to come back.

The 1957 slogan is "The Mentally Ill Can Come Back—Help Them—Give" (of understanding, service, and funds). The Association has prepared a kit of materials that is available for publications such as state health bulletins as well as for newspapers and magazines. 10 Columbus Circle, New York 19.

Symposium on Controlled Vaccine Field Trials: Poliomyelitis

THOMAS FRANCIS, JR., M.D., F.A.P.H.A.

Are control groups and test groups entirely comparable? It is easy to assume that random samples of the same universe must be. The pains taken to assure the essential similarity of the groups in this study should prove a suggestive example for research workers in any field.

A fundamental principle of experimentation is to seek a design which is so balanced as to provide a measure of the factor being subjected to test. The fewer the variables involved the more direct the interpretation may be. Studies in human populations can rarely approach the simplicity and precision of physical experiments or those that can be formulated as a purely mathematical concept. It is, nevertheless, toward this ideal that studies should reach when the attempt is made to establish a controlled experiment. The controls are intended to provide a group so comparable to the test unit that the only determinable difference between them should relate to the influence in question. The known or theoretical variations in the population subjected to study should be so randomized as to avoid any known or suspected imbalance between test and control groups. Under these conditions even unknown factors can be expected to distribute themselves randomly. As a result the subjects entered in a study under such restrictions become the experimental universe into which other groups of different or unknown characteristics cannot properly enter.

A second requirement is that observations should be so standardized that they apply equally and without bias to the entire study population. The more readily the end point can be measured with accuracy, uniformity, and finality, the less the observations are subject to variations relating to the observer. The less readily the observer can distinguish between test and control subjects, the more likely it is that variations in observation will balance out in the groups.

The Field Trial in 1954 of the Salk poliomyelitis vaccine was obviously not a simple setup, since it involved scattered study areas and diversified observers. The formulation of plans and selection of study groups was influenced by limitations in time, by administrative considerations, by uncertainty as to the number of volunteers, and the supply of vaccine. Much was dependent upon what was acceptable to parents and local officials. Great effort was made, however, to impose standard procedures for registration, observation, and reporting. The placebo plan of study, moreover, sought to meet the essential requirements of the scientific method in its establishment of the population to be studied. Since voluntary participation was inevitable, the members of the population who requested participation in any geographic area were registered

Dr. Francis is professor and chairman, Department of Epidemiology, University of Michigan School of Public Health, Ann Arbor, Mich.

This paper was presented before a Joint Session of the Epidemiology and Statistics Sections of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 16, 1956.

This study was aided by a grant from the National Foundation for Infantile Paralysis.

at the classroom level and were then given an injection of material the nature of which was unknown to them, to the injector, or to subsequent observers. The materials were distributed by code in an essentially random manner, but in equal numbers within the classroom population. Consequently, the matching in characteristics of test and control subjects should be demonstrable: that they were essentially identical was illustrated in a variety of measurements.

¶ The numbers by individual years of age, by sex, and by color were the same.

¶ They were divided equally according to the lot of vaccine and corresponding placebo.

¶ The number who did not complete their course of injections was essentially the same for vaccine and placebo.

¶ The percentages with or without antibodies to one or more types of poliomyelitis virus were, with two small deviations, the same.

¶ Their prestudy distribution in titers of antibody to the respective types of virus were essentially the same.

¶ The vaccinated and placebo groups derived with equal frequency from areas of high and low degrees of participation.

¶ They appear to be equivalent in terms of socioeconomic characteristics.

¶ Because of the lack of identification as to nature of the inoculum, observation of the two groups in any given area would be the same. The data and their interpretation were handled on the same basis without identifying knowledge.

¶ The essential identity of the behavior of the two groups is shown by the fact that the extent of their absenteeism from school for various reasons for a period of six weeks after their injections was much the same.

¶ The incidence of reported poliomyelitis in the two groups in the nine weeks after the first injection was the same, and this is the period when any harmful effects of either vaccine or placebo would be expected to become evident.

All these features clearly demonstrate a strict comparability from many angles of the test groups in placebo areas. In this respect it well met the requirements of sound scientific experimentation.

Those who refused to permit the inoculations cannot by principles of scientific experimentation be accepted as another group of comparable controls. There has been a long-term recognition of the risks in comparing results in volunteers against those who do not volunteer. But in the present study certain demonstrable features clearly distinguish those who refused from the actual test population. First of all, they specifically refused participation.

A survey, on a concealed basis, of socioeconomic status of participants and refusals in placebo areas was made while the Field Trial was still in progress. Significant differences in these characteristics were observed and the history of vaccination against other diseases correlated with participation in the Field Trial.

¶ On the basis of reported serologic surveys the refusals, who exhibited less favorable socioeconomic standards generally, could be expected to be more resistant to poliomyelitis.

¶ Although the causes of absenteeism from school were of about the same distribution as in vaccinated and placebo members, the duration of absences among the refusals was only half as great as in the test groups. As Koller has suggested, this indicates that the test groups have parents who are more concerned with their childrens' health problems and would bring them more commonly to medical attention and that this should apply to questions of poliomyelitis.

¶ It is not known whether refusal to participate in the vaccination reduced the likelihood of medical attention or the reporting of mild cases of poliomyelitis, but the possibility exists that this

could be quite different from the situation in the actively participating groups with different motivation.

¶ While equal proportions of vaccinated and placebo groups came from areas of low participation a much larger proportion of the refusing group derived from low participation areas.

¶ No specimens of blood were obtainable for study of antibody content in comparison with those subsequently vaccinated or given placebo.

¶ By refusing to participate and to be injected, the refusals are readily distinguishable if brought to observation subsequently, and the very biases which concealed placebo injections would eliminate, enter into considerations of the "No" group.

These data add specific information of general value in studies employing volunteers from a human population. The differences noted provide additional evidence that the segment of the population which refused participation differs sufficiently in significant features from the participants as to warrant the conclusion that they are not of the same composition as the vaccinated and placebo groups which are, in reality, equal and matched parts of one population segment. The refusal group is clearly not comparable. All the demonstrated and theoretic differences indicate that they should have a lower incidence than that in the placebo controls. It has been somewhat surprising, therefore, to note that some reviewers have taken the noninoculated group as the standard of reference for interpretation of the results in the test groups.

On the face of it, this is a flight from the principles of experimental procedure. The placebo group is the control for the vaccinated. Most of the comments have centered around the suggestion that the higher incidence in placebo controls than in uninoculated was evidence of provocation of paralytic poliomyelitis by the placebo injections. The preceding discussion clearly emphasizes that such a conclusion from that comparison is not valid. The evidence concerning the possibility must be sought elsewhere.

This brings up a question of the way the plan of procedure could have better met the situation. It was thought that if the placebo was bland enough that provocation would be unlikely, especially since inoculations were to be made before the prevalence of poliomyelitis became significant. It has usually been of low incidence even in high epidemic periods and the demonstrable influence is of relatively short duration. Moreover, it would serve as a control for other forms of reported reactions related to inoculation. If an uninjected control group were used this would be to revert to the disadvantages of observed controls.

The other possibility would be to maintain a control group within the same participating population that would be given a stimulus which closely simulated injection. Here one is confronted with the problem of practicability and acceptance in an extended human population. And it may be pointed out that while the observed area studies do not have the same intrinsic quality as those in placebo areas some parallels may be of value in aiding interpretation. Moreover, for certain clinical correlations or for temporal relationships the data from uninoculated persons may be compared with those among vaccinated.

In consideration of possible provocation by placebo injections the following features can be mentioned.

The incidence of reported paralytic cases of poliomyelitis was directly proportionate to the size of the population segment, vaccinated-placebo-uninoculated, during the first seven to eight weeks in placebo and observed areas; this is the period when provocation or infection from vaccine would be expected to be exhibited. After the ninth week the cumulative curves for vac-

cinated and placebos deviate sharply and those who refused inoculation take an intermediate position. The same pattern holds in observed areas where controls were uninoculated.

It is of interest that the paralytic rates during the study period among the vaccinated were the same in placebo and observed areas, 16 and 17, respectively. The paralytic rates for the refusing, uninoculated population were about the same in placebo and observed areas, 36 and 34, respectively. These two groups are specifically identified with respect to acceptance or refusal.

The paralytic rate in placebo controls was 55/100,000 or 54 per cent higher than in those who refused inoculations*; the rate of 46 in the designated observed controls who received no injections was 35 per cent higher than in those who refused vaccination in observed areas. It is apparent, therefore, that the differences between uninoculated nonparticipants and controls cannot be attributed to the effects of placebo injections. Furthermore, if one considers the virus-positive or laboratory-positive cases, the difference between the control and refusal groups is greater in observed areas than in placebo areas where the controls received injections of placebo.

The placebo control group was made up exclusively of active participants while the designated controls in observed areas were a mixture of "Yeses" and "Noes." Unfortunately, in observed areas the registration of children in the first and third grades as to their acceptance was irregularly carried out. However, if one assumes that the extent of participation would have been essentially the same in these designated observed controls of the first- and third-grades as in the second-grade children who were offered vaccination the observed controls would contain 65 per cent acceptances and 35 per cent refusals. Applying the rate of 55 in placebo controls to the 65 per cent acceptances and that of 34 to the 35 per cent refusals an expected rate of 48 is obtained for the total observed controls in comparison with the 46 which was recorded. On this basis the difference noted between paralytic rates among placebo and observed controls would be related to the presence in the latter of a proportion of refusals with an expected lower rate than the participating component of that group. Knowledge of the differences between the two segments make this a plausible explanation. ¶ There was no evidence of selective localization of paralysis in the placebo group in comparison with observed controls or nonparticipants.

¶ It was suggested by one group of Germans that the placebo children had higher rates because of more intimate

* The rates for paralytic poliomyelitis among the vaccinated in placebo and observed areas were the same. The rates for those who refused were the same in the two studies. Assuming that the proportion of acceptances among designated controls of the first and third grades in the observed areas was the same as in the second grade we have:

Acceptances	65%
Refusals	35%

If the rate of 55 for placebo controls is applied to the 65 per cent estimated acceptance among controls of observed areas and the rate for refusals in observed areas is applied to the 35 per cent estimated refusals one obtains:

65% × 55 rate = 35.75
35% × 34 rate = 11.9
The expected rate for observed controls = 48
The observed rate for observed controls = 46

	725,200 observed controls	
65% acceptances	481,380 × 55 (placebo paralytic rate) =	265 expected cases
35% refusals	243,820 × 34 (refusal paralytic rate) =	83 expected cases
	48 expected rate	348 expected cases
	46 observed rate	330 observed cases

association with the vaccinated children in school; this did not take into account that most schools recessed shortly after vaccination was completed. Furthermore, the uninoculated belong in the same schools.

¶ There was no difference in the rate of reported poliomyelitis in families containing vaccinated, placebo, or uninoculated children.

¶ The recovery of virus from children in exposed families of observed controls who were not inoculated but gave consent was similar to that in families of placebo or vaccinated members, but the recovery of virus in families of children who said "No" was distinctly less. There was no evidence therefore of increased spread of virus from vaccinated and placebo children—but a possible suggestion that the refusing families were less susceptible.

In summary, the basic design of the placebo study resulted in strictly comparable groups that received vaccine and placebo, respectively. Consequently, the placebo controls must be accepted as the proper controls and comparisons of incidence with other groups of demonstrably different character is not reasonably permissible. It is justifiable to accept the rates in placebo controls as the true incidence unaffected by any exaggerating influence and the difference between vaccinated and placebo as the effect of vaccine.

The data from the uninoculated controls of observed areas are in agreement with those of observed areas and add additional data of value to consideration of the problem of provocation by placebo injections. Examination of the data from many aspects gives no evidence that provocation of paralytic poliomyelitis occurred in any measurable manner.

The Place of the Convalescent Home

A Convalescent Care Study Committee, under the joint sponsorship of the Hospital Council of Greater New York, the United Hospital Fund, and the New York Academy of Medicine, is making a study of convalescent homes. The aim is to define their future role, the meaning of convalescent care, and the needs of convalescent patients. It is the hope that the study may result in the development of principles applicable to wider areas than that of the New York City region.

The study is being done at the Columbia University School of Public Health and Administrative Medicine under the general direction of E. Dwight Barnett, M.D., director of administrative medicine. Project director is Magda P. Shorney, M.D., instructor in administrative medicine. Chairman of the Study Committee is George Bugbee, president of Health Information Foundation and former head of the American Hospital Association. The committee is scheduled to report late in 1957.

The Role of Preventive Medicine in Highway Safety

ROSS A. McFARLAND, Ph.D.

Highway accidents fall within the province of preventive medicine and the health officer has as much responsibility for their control as he has for preventable diseases. This is the thesis ably developed here.

It is now generally recognized that the number of accidents on our highways has attained the epidemic proportions of a noncontagious mass disease. During the current year approximately 42,000 people will be killed, 400,000 permanently impaired in some way, and a million temporarily disabled. It seems only logical, therefore, that public health should assume responsibility for the control of this threat as it did earlier in the field of quarantinable diseases. In general, accident distributions show variations according to season, age, sex, and other parameters, and are considered to follow principles comparable to the basic biologic laws which influence the processes of diseases.[10]

Because of the important role played by human variables, the control of accidents falls within the province of preventive medicine and public health as do the fields of industrial hygiene and sanitary engineering. In most instances, there is multiple causation in accidents and attempts at control should involve consideration of the interaction of host, agent, and environment, i.e., the worker, the equipment, and surroundings or working area. Although the host is of primary medical concern, the agent and the environment must also be considered in effective preventive measures. This applies equally to military and civilian populations, under all conditions, including combat.[12]

The physician or health officer has a direct responsibility in the prevention of accidents, not only because of his broad training in the biologic sciences and the important role played by human variables in accidents, but also because he is in a favorable position to teach while treating injuries. One of the basic laws in psychology is that memory operates most effectively when reinforced by emotion. Thus the physician should take the initiative in identifying the causes of accidents leading to their occurrence and indoctrinate patients with the principles of accident prevention while they are being treated.[16]

The next important advances in safety are most likely to result from more effective collaboration between the engineering and biologic sciences. The team approach is not new in medicine and has been essential to many important advances. For example, in the epidemiologic study of malaria, collaboration between the entomologist, the sanitary engineer, and other specialists was necessary to secure the basic data and bring about control. The prevention of motor vehicle accidents can similarly be furthered through the aid of the physiologist, the psychologist, the anthropologist, and the safety engineer in cooperation with the physician to try to bring about better control.[15]

The approach to accident prevention should include the point of view of preventive medicine. The public health officer or physician can play an important role in bringing about the needed reorientation. This has already been

accomplished in some situations. An example is given below to show how a simple application of this approach has been carried out successfully in the United States Army. At one establishment where the accident rate was high, the safety director had a card file of the highway accidents of the base personnel, extending over several years. The medical officer assisted the safety director in analyzing the accident data in an epidemiologic manner, i.e., in terms not only of location, but also of time of day, rank, and various factors relating to the type of accident. It became apparent that certain features of one highway were especially dangerous, and 90 per cent of the accidents that occurred there took place during a particular two-hour period in the day. On the basis of the information from this analysis, the Safety Department was able to concentrate patrol activities at the appropriate places and times and to indoctrinate the personnel regarding the characteristic errors in driving which caused most of the accidents. When these procedures were put in effect, there was a substantial reduction in accidents.

The major thesis which is being presented here is that existing concepts of preventive medicine and public health should be broadened to include all elements affecting the well-being of persons in their movement from place to place. If the end results rather than the causal mechanisms are considered, then what difference does it make whether large numbers of people are killed or crippled by disease, or injury? Transport accidents, especially those involving motor cars, now constitute one of the greatest hazards to the health of society as a whole, and preventive medicine should assume additional responsibility for preventing accidents as in other areas of health.[12] Our attitude toward the existence of this epidemic of accidents should be one of resentment, as stated by Dr. Alan Gregg in relation to the prevention of disease: "Why do these things keep occurring? Why do they have to continue? Why do they have to be, in the light of what we privately know?" [11]

The Epidemiologic Approach to Highway Safety

The first step in the application of the epidemiologic approach should be to set forth the basic physical, physiologic, and psychologic characteristics of the host. When such facts are associated with the agent, e.g., the vehicle, under any given set of environmental conditions, information can be obtained which will aid in understanding and preventing accidents. Factual information of this sort can be discovered only by carefully controlled experimental studies, epidemiologic surveys, and statistical analysis.[15]

Some Findings Concerning Host Factors

¶ The nature of the important requirements of safe driving may be revealed through a "job analysis" of driving. Not only must the driver first learn a series of complex coordinated tasks involving both hands, both feet, vision, hearing, and touch, to the point where they are automatic—making judgments of changing space-time relationships must also be learned. The short time intervals within which reactions must be completed mean that foresight, planning, and the appreciation of hazards are major factors in safety. It is probable that more continuous attention from

Dr. McFarland is associate professor, Harvard School of Public Health, Boston, Mass.

This paper was presented before a Joint Session of the American School Health Association and the Engineering and Sanitation, Health Officers, Occupational Health, and School Health Sections of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 15, 1956.

moment to moment is required of the driver of a motor vehicle than of the operator in any other type of transportation, including the airplane.[6]

¶ Many specific attributes of the "host" have been investigated, but it is apparent that no single characteristic of drivers is outstanding in accounting for a large proportion of accidents on the highway. Those attributes most clearly having a relationship to accident frequencies include low intelligence, youthfulness, and a personality make-up in which social responsibility is weak or lacking.[19]

¶ Drivers of about 25 years of age and younger have accidents more frequently, in relation to their numbers, than do drivers in the age groups 30 through 60 or 65.[19, 24] The most recent and most complete information (from Connecticut) indicates the rates are highest for the youngest drivers, i.e., age 16, and the rate decreases with each additional year of age to about age 30 or 35, remaining stable from this point on.[5] The factors responsible for the high rate of the younger drivers are believed related to (a) inexperience, and (b) temperamental qualities of youth.

¶ A promising method for detecting accident repeaters is based on the concept that "a man drives as he lives." Until recently it was widely accepted that "accident-proneness," an elusive and not very precisely defined concept, was a major cause of highway accidents. Statisticians, however, have shown that finding a small proportion of drivers responsible for a relatively large proportion of the accidents may not indicate accident-proneness, but be the result of chance. Even when accidents occur by chance, some individuals will have more than others. This is illustrated in Table 1.[24]

When statistical studies on motor vehicle accidents have been carried out taking the influence of chance into account, only a relatively few drivers appear to be unusually susceptible to accidents as a result of innate characteristics, and hence could be termed "accident-prone." Also, studies over successive periods of time have shown that it is not the same persons who have repeated accidents in the different periods. For these reasons, it seems preferable to use the term "accident-repeaters" and to study the circumstances of accidents in a given period of time.

Table 1—Chance Distribution of 300 Accidents in a Group of 500 Persons [24]

Number of Accidents, per Person	Theoretical Number of Cases, by Chance
0	275
1	165
2	49
3	10
4	1

Another approach has been clinical. The psychiatric study of accident-repeaters has led to the view that certain persons may have accidents on the basis of unconscious needs and motivations.[3] It is important to recognize that while emotional states are undoubtedly of significance in many accidents, the application of the above concept for the detection of accident-repeaters is limited by the subjectivity of the method. It would be an unimaginative psychologist or psychiatrist who could not find some indications of the conflicts and repressed feelings consonant with this theory, particularly after an accident has occurred.

A more objective and useful procedure for identifying accident-repeaters has been suggested by Tillmann, in Canada, as a result of clinical findings that maladjustment in meeting the demands of life is far more frequent among accident-repeaters than in accident-free drivers. On the basis of records of contact with adult and juvenile courts, venereal disease and public health

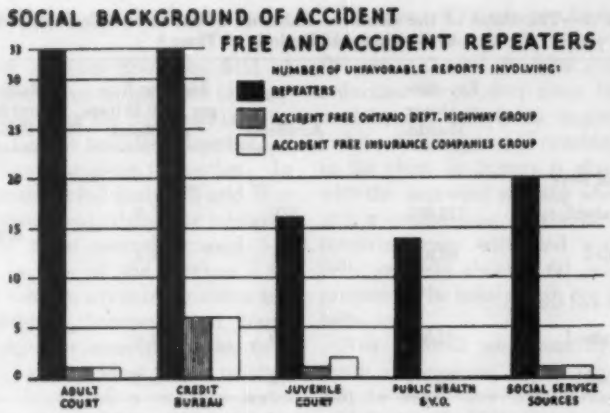


Figure 1—The Social Background of Accident-Repeater and Accident-Free Taxi Drivers as Determined by Means of Case Histories and Confidential Interviews.[25]

clinics, credit bureaus, and social service agencies, there was a marked difference between a group of accident-repeater drivers and two separate groups of accident-free drivers. Sixty-six per cent of the accident-repeaters were known to one or more of these agencies, compared to 6 per cent of the accident-free, as shown in Figure 1.[25] These findings were corroborated in a study at the Harvard School of Public Health when similar procedures were used with a large sample of truck drivers. In addition, accident-free and accident-repeater drivers were carefully matched and a statistical analysis made to determine the relative importance of the various items. In this way, weighted scores were assigned to the items, and when these were applied in a new sample, the accident-repeater and accident-free drivers were identified with an accuracy of about 80 per cent.[20]

¶ There is increasing evidence that factors of personality, adjustment, and attitude are of primary importance in safe driving. Currently, the personal and interpersonal factors in accidents are being investigated in an extensive research project at the University of Colorado. The findings thus far indicate that there are distinct characterological and personality differences between drivers with low accident, moderate accident, and high accident experience. For example, consistently different patterns for accident-repeater and accident-free drivers have been found on the Allport Vernon Scale of Values. The accident drivers tended to make higher scores on the "theoretical" and "aesthetic" scales of this test, and lower scores on the scale of "religious" values. Findings such as these are now being evaluated in relation to other tests and the results of intensive clinical interviews, to define the differences more closely.[8]

¶ Adequately training drivers appears an effective way of reducing accidents. Several controlled studies on the effect of high school driver training programs indicate that the students with formal training have lower accident and violation rates than those who learned to drive in other ways.[19, 24] Table 2 summarizes the findings from eleven such studies.[9]

¶ The role of fatigue in highway accidents may best be understood from

Table 2—The Ratio of the Accident Rates of Untrained to Trained Drivers in Comparable Periods of Time [9]

	Exposure in Driver Months	Accidents	Accident Rate per 1,000 Drivers per Month	Ratio of Accident Rates
Men and Boys				
Untrained	123,865	979	7.9	1.8
Trained	61,818	265	4.3	
Women and Girls				
Untrained	42,581	110	2.6	2.2
Trained	62,272	72	1.2	

the standpoint of the characteristic ways in which skilled performances like driving deteriorate during protracted periods of exercise. An early effect is a disturbance of the timing of responses. Later on, the driver tends to react to particular stimuli, ignoring others. Errors, when recognized, tend to be overcorrected. An important effect is a loss of insight into the quality of performance, and a failure to recognize the full potentialities of dangerous situations.[18] In addition to the hours of driving, consideration must also be given to such factors as amount and quality of previous rest, the nature of activities prior to driving, and concurrent emotional stress.[20]

¶ Driving skill is adversely influenced in many persons with as little alcohol in the blood as 0.03 and 0.04 per cent. Controlled studies show that the likelihood of accidents increases consistently as the alcohol in the blood increases from the lowest levels. This is illustrated in Table 3.[24] In a more recent study the risk at 0.10 per cent blood alcohol was estimated more than twice that at 0.05 per cent while the risk at 0.15 per cent appeared at least tenfold (cf, 19). It is of interest to note that blood alcohol levels exceeding 0.10 per cent were found in 52 per cent of the series of 269 cases in autopsies of drivers killed in accidents in Nassau County, N. Y. This same trend has been observed in two other studies.

Host-Agent Relationships

A basic principle in the new discipline known as human engineering is that vehicular design must be intimately related to the biologic and psychologic characteristics of the operators. Studies in this field have shown that many accidents on the highways and in industry have occurred because sufficient attention was not given to human capabilities and limitations in the original design. Frequently errors, usually attributed to human failure, may actually be induced by poor design features. Several illus-

Table 3—Relative Frequency of Automobile Accident Cases for Different Alcohol Concentrations [24]

Per cent Alcohol in Blood	Number of Accident Cases per 100 Control Cases
None	9
Less than 0.04	45
0.04–0.07	21
0.08–0.11	53
0.12–0.15	146
0.15 and over	577

trations may help to clarify this point of view.

The first is taken from the field of aviation. Confusion arose when the controls for operating the flaps and landing gear were located too close together, or reversed from one plane to another. In one 22-month period during World War II, inattentive manipulation or mistaken identity of these controls caused 547 accidents in one of the services. Of these, 273 were in advanced trainers and 184 in fighters, bombers, and transports.[13] Another example relates to a serious highway accident which resulted when the driver of a modern automobile, traveling at high speed at night, inadvertently shut off the headlights in the belief that he was pushing the cigar lighter. The knobs for these two were identical in shape and size and were located next to each other on the dashboard.

An evaluation of trucks and buses revealed numerous examples of faulty design when considered from the standpoint of (a) the range in body size of the drivers; (b) the biomechanics of human movements and postures, and (c) the characteristics and limits of human perception.[20, 21]

The crash and impact forces in a large proportion of motor vehicle accidents which have been fatal are within the physiologic limits of survival of the human body, if the momentum of the body can be properly checked and the forces dissipated by certain design features. Steering wheels, doors which pop open on impact, instrument panels, windshields, and the back of the front seat have been identified as major structural features causing injury to vehicle occupants during crashes. Ejection through opened doors was found to be the greatest single factor in injury, with ejection more than doubling the risk of moderate through fatal injury.[22] On the basis of such information improvements were introduced in a number of 1956 cars. Preliminary findings from the Automotive Crash Injury Research Project at Cornell indicate a substantial reduction in ejection rates in the new models, due mainly to improved door locks. A reduction of crushing injuries to the chest in drivers is also apparent with the improved steering wheel design, and a comparison of similar accidents involving cars with and without seat belts suggests about a 60 per cent improvement in injury with the use of the belts.

Any control unnecessarily hard to reach and operate, any instrument difficult to read, any seat inducing poor posture or discomfort, or any unnecessary obstruction to vision may contribute directly to an accident because of the effect on the performance of the driver. Man is a poor monitor of equipment, and where safety considerations are involved, anything which might be done to monitor the driver by means of warning devices is highly desirable. In addition, it should be kept in mind that both men and machines are likely to become unstable or break down under overloads. Finally, the cumulative effects of undue burdens imposed by poor design features are sure to induce fatigue, resulting in the over-all deterioration of operating efficiency and perhaps leading to an accident.[7, 14]

Host-Environment Relationships

Several of the physical variables in the environment have important effects on the safety and efficiency of driving. Such factors as the level of illumination, the concentration of carbon monoxide in the air, the condition of the roadway, and the presence of traffic need to be understood in terms of the interaction of the host, agent, and environment in creating hazardous situations. In some instances, these relationships can be expressed quantitatively. Values for several of the important factors are shown

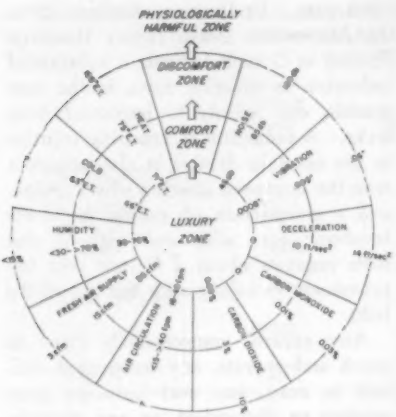


Figure 2—The Physical Variables of the Environment Influencing Driver Comfort, Health, and Safety. These Values Must Be Considered Approximations Since Each Variable Is Interdependent on One or More Additional Factors.[17]

schematically in Figure 2.[17] A few examples can be given to illustrate the principles involved.

The first example will be taken from the field of human vision in reference to the level of illumination in the environment and the high incidence of night accidents on the highway. The National Safety Council reports that motor vehicle accident rates are three times higher at night than in the daytime. This difference is believed due in large part to the relatively low illumination available during nighttime driving.[1]

Older drivers might be expected to encounter greater difficulty in driving at night than younger ones. If the illumination is low, they require more light than do younger persons to detect objects which are near the lower limits of visibility. Figure 3 illustrates how the light sensitivity of the eye reaches a maximum during a period of dark adaptation. In Figure 4 the final adaptation levels for subjects ranging from 20 to 70 years of age are plotted against age. From these data it is calculated that for a dim light or object to be just seen by an eye in the dark, the illumination must be doubled for every increase of 13 years in age.[18] In this connection, the use of tinted windshields at night by older drivers may present special hazards since the tinted glass further reduces the effective illumination.

Various studies have shown that the volume of traffic tends to decrease during inclement weather, but accident rates per unit of travel are greater. Apart from considerations relating to visibility, an important "host" factor is that of the driver's training and experience in the operation of vehicles under adverse circumstances. For example, when skidding accidents on the Pennsylvania Turnpike were analyzed, it was apparent that the particular practices carried out by drivers often precipitated or prolonged the skidding. It was concluded that a lack of training in proper methods of operating on slippery roads was an important causal factor in these incidents.[28]

The lethal effects of exposure to carbon monoxide are well known. With exposure to subclinical concentrations of this gas, there are also deleterious

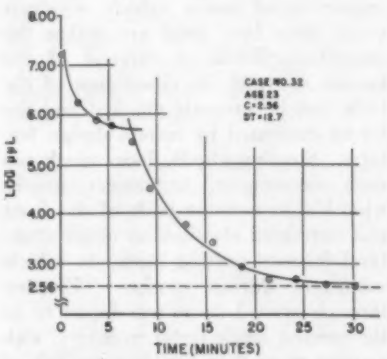


Figure 3—The Dark Adaption Curve for an Individual Subject, Showing the Computed Final Level of Adaptation (C).[18]

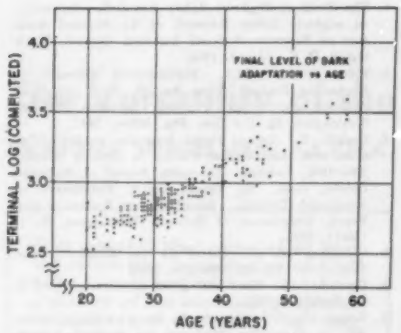


Figure 4—Scatter Diagram Showing the Relationship Between Age and Final Level of Dark Adaptation.[16]

effects upon various human reaction systems, which may constitute hidden factors in numerous accidents. For example, one early effect is a reduction in the sensitivity of night vision.[13] Other insidious effects include reduced alertness and drowsiness. While the usual source of carbon monoxide in automobiles is the exhaust from the engine, a driver may absorb additional amounts of the gas from tobacco smoke inhaled from cigarettes.[17]

Driving practices at any one time tend to be adapted not to the conditions being newly encountered, but to the traffic situation met just previously.[2]

Quality control statistics can be used to detect unusual trends in accidents, and to indicate the need for a prompt analysis of the situation to determine the causes of changes in accident rates.[2]

Summary and Conclusions

It has been brought out in this discussion that accidental trauma has reached epidemic proportions among our civilian and military populations. Accidents, particularly those occurring on the highway now constitute the outstanding threat to the health and productive resources of the nation.

The thesis is developed that the control of this threat to health and safety falls within the province of preventive medicine, and that the medical officer and physician has as much responsibility for the prevention of accidental death and injury as for the prevention and treatment of disease.

It is proposed that the epidemiologic approach originally developed for the control and study of mass infectious disease is also applicable to the study and control of accidental trauma. Similar biologic principles are involved, and because of the multiple causes of accidents, a team approach is a basic requirement.

In this view accidents are considered to result from the interactions of three different factors: (1) the host (the worker, or driver), (2) the agent (or equipment), and (3) the environment. The host is of primary medical concern, and the physician, because of his knowledge of the characteristics of the host, is in an especially advantageous position to contribute to the analysis of accident causes, and to educate in safety while treating.

One of the most important working rules is that the job to which a person is assigned should be related to his behavioral, psychologic, and physical characteristics. The influence on safety of various temporary states in the individual, such as fatigue, emotional problems, and the effects of alcohol, can hardly be overemphasized.

Methods of detecting the accident-repeater in advance have not yet been perfected, but the most promising approach is based on the concept that "a man works (or drives) as he lives." At the very least, medical officers and industrial physicians can identify those with a record of repeated accidents, and through clinical approaches determine how well adapted they are to their jobs and responsibilities.

One important way of improving safety is by the design of equipment in

terms of human capabilities and limitations. This involves the closer integration of the host-agent relationships through the application of the principles of human engineering. Such an approach utilizes an advance analysis of possible faults in the design of the equipment and can aid substantially in the reduction of accidents.

The third phase of the epidemiologic approach, the host-environment relationship, is concerned with the effect of the physical variables on the individual. Such factors as the level of illumination, the temperature and humidity, carbon monoxide and other toxic agents are of importance. For each of these variables there are reasonably well defined zones of comfort and discomfort, and ranges where the efficiency of human performance is reduced to the detriment of safety.

In conclusion, the physician of today and the future can play an important role in the prevention of accidents. The next significant advances will be obtained by carefully controlled experimental and clinical studies, epidemiologic surveys, and statistical analysis, and with the medical officer working in close collaboration with other biological specialists, engineers, and administrative officers. Finally, in the words of the poet, T. S. Eliot—

> "These are only hints and guesses
> Hints followed by guesses; and the rest
> Is prayer, observance, discipline, thought, and action." [4]

REFERENCES

1. Accident Facts. National Safety Council, Chicago, Ill. 1956 ed.
2. Annual Report of the Commission on Accidental Trauma, 1955–1956. Armed Forces Epidemiological Board, Department of Defense, Washington, D. C., 1956.
3. Dunbar, H. F.; Wolfe, T. P.; and Rioch, J. M. The Psychic Component of the Disease Process (Including Convalescence) in Cardiac, Diabetic, and Fracture Patients. I. Am. J. Psychiat. 93, 3:649–679, 1936; II. Ibid. 95, 6:1319–1343, 1939.
4. Eliot, T. S. The Complete Poems and Plays, 1909–1950, New York, N. Y.: Harcourt Brace, 1956.
5. Facts, 1955. Connecticut State Motor Vehicle Department, Hartford, Conn., 1956.
6. The Field of Highway Safety Research. Committee on Highway Safety Research of the National Academy of Sciences—National Research Council, Washington, D. C., (Aug.), 1952.
7. Fitts, P. M. (Ed.). Psychological Research on Equipment Design. Rept. No. 19, Army Air Force Aviation Psychology Program Research Reports. Washington, D. C.: Gov. Ptg. Office, 1947.
8. Gaskill, H. Annual report from the project, "Personal and Interpersonal Factors in Driving Safety," 1955–1956, Colorado University School of Medicine, Denver, Colo. In, Annual Report, Commission on Accidental Trauma. Armed Forces Epidemiological Board, Department of Defense, Washington, D. C. (May), 1956.
9. Glanville, W. H. Safety on the Road. J. Soc. Roy. Arts 102, 4426:496–519, 1954.
10. Gordon, J. E. Epidemiology of Accidents. A.J.P.H. 39, 4:504–515, 1949.
11. Gregg, Alan. Commentary by Dr. Alan Gregg. Chap. VII in Preventive Medicine in Medical Schools. J. Med. Educ. 28 (10, pt 2):102–107, 1953.
12. McFarland, R. A. Public Health Problems of Transportation, with Special Reference to Aviation, Chapter in "Public Health in World Today." Simmons, J. S. (Ed.). Cambridge, Mass.: Harvard University Press, 1949.
13. ————. Human Factors in Air Transportation—Occupational Health and Safety. New York, N. Y.: McGraw-Hill, 1953.
14. ————. Human Engineering: A New Approach to Driver Efficiency and Transport Safety. Soc. Automot. Eng. Trans. 62:335–344, 1954.
15. ————. Research in the Field of Accidental Trauma. Mil. Med. 116, 6:426–435, 1955.
16. ————. Epidemiologic Principles Applicable to the Study and Prevention of Child Accidents. A.J.P.H. 45, 10:1302–1308, 1955.
17. ————. Human and Environmental Factors of Automobile Safety. Soc. Automot. Eng. Trans. 64:625–643, 1956.
18. McFarland, R. A., and Fisher, M. B. Alterations in Dark Adaptation as a Function of Age. J. Gerontol. 10, 4:424–428, 1955.
19. McFarland, R. A.; Moore, R. C.; and Warren, A. B. Human Variables in Motor Vehicle Accidents: A Review of the Literature. Harvard School of Public Health, Boston, Mass. (Oct.), 1955.
20. McFarland, R. A., and Moseley, A. L. Human Factors in Highway Transport Safety. Harvard School of Public Health, Boston, Mass., 1954.
21. McFarland, R. A.; Moseley, A. L.; Damon, A.; Stoudt, H. W.; Dunlap, J. W.; and Hall, W. A. Human Body Size and Capabilities in the Design and Operation of Vehicular Equipment. Harvard School of Public Health, Boston, Mass. 1953.
22. Moore, John O. Annual Report from the Automotive Crash Injury Project, 1955–1956, Cornell Medical College, N. Y. In "Annual Report, Commission on Accidental Trauma." Armed Forces Epidemiological Board, Department of Defense, Washington, D. C., May, 1956. Also, Annual Report for 1956–1957 (in preparation).
23. Pennsylvania Turnpike Joint Safety Research Group, Eckhardt, P. K. (Ed.). Accident Causation. Swissvale, Pa.: Westinghouse Air Brake Company (Sept.), 1954.
24. Thorndike, R. L. The Human Factor in Accidents, with Special Reference to Aircraft Accidents. Final report, Project 21-30-001, School of Aviation Medicine, U. S. Air Force, Randolph Field, Tex. (Feb.), 1951.
25. Tillmann, W. A., and Hobbs, G. E. The Accident-Prone Automobile Driver. A Study of Psychiatric and Social Background. Am. J. Psychiat. 106, 5:321–331, 1949.

The Versatility of the Life Table

MORTIMER SPIEGELMAN, F.A.P.H.A.

It is possible that some of us may use terms like "expectation of life" quite loosely and without too sharp a picture of the way such projective estimates are derived. Not only are this and related matters cleared up here, but the special uses to which the life table may be put are also indicated.

It may be useful, at the outset, to clarify the basic concepts of the life table as a tool for measuring decrements and survivals in a group or aggregate newly formed for observation. In doing so, distinction will be made between the realistic nature of the generation life table and the hypothetical nature of current and projected life tables.

Basic Concepts

Generation Life Tables—Although the life table concepts to be described may apply to human, animal or insect lives, cases of illness, marriages, items of industrial equipment, or any other entity, for present purposes reference will be made principally to human lives. Consider a countable aggregate or cohort of newly born lives, each of which is identified by one or more common characteristics of a specified nature. Some or all of the lives may also have characteristics other than those specified to define the group, but these are of no concern at this point. In the course of time, the group will gradually lose individual lives, the process of attrition continuing until the last life has dropped out. It may be assumed, further, that a means is on hand either to enumerate the lives remaining in the group at the end of stated time intervals or to count the number of lives lost to the group during each time interval. These time intervals need not necessarily be equal, but in dealing with human lives, the year is a convenient unit.

After the last life is gone, it is a simple matter to compute the total years of life lived by the entire group and so the average number of years lived by the individual lives since the group was formed. In the same way, at any point of time in the history of the group, a computation may be made of the total years of life remaining to the individuals surviving at that time, and of the average number of years remaining to the individual lives. It is also possible to compute the ratio of the number of lives lost within a year to the number in the group at the beginning of that year or to the average number in the group during that year. Such ratios are termed "rates" by the vital statistician and the actuary.* Since age is described by elapsed time, the foregoing averages and rates may be

* The information on hand will also permit the computation of the annual rate of loss of lives to the group corresponding to the loss at any instant of time, per head surviving at that time, the term "rate" being understood here in the same sense as a physicist uses it to describe velocity.

Mr. Spiegelman is associate statistician, Metropolitan Life Insurance Company, New York, N. Y.

This paper was presented before a Joint Session of the American Association of Registration Executives and the Statistics Section of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 13, 1956.

referred to in terms of age instead of years elapsed since the group was formed.*

This accounting of the attrition process contains all the fundamentals of the cohort or generation life table. Such a table is merely a record of past experience of the group or cohort covering a period from birth to the loss of the last life.

Current and Projected Life Tables—If only the age-rates of attrition are observed for a generation of lives during its existence, then with a given initial size of the cohort, it is possible to compute the number remaining to successive ages, the number dying within successive age intervals, the total years lived by the cohort after any age, and the average years remaining to the individual lives after any attained age. In fact, similar computations may be made with any set of age-rates of attrition that may be written down. However, unless the attrition rates are derived from the actual experience of a generation, the computations made from them represent purely hypothetical situations. Thus, we have a hypothetical situation in the "current" life table derived from the mortality rates according to age observed during a short calendar period among the many generations then in existence, each of which may be described by its year of birth.[1]

Even more hypothetical is the projected life table computed from projected or forecast rates of attrition by death. Illustrations of generation, current, and projected life tables are easily accessible.[2] The methods used to compute them may vary with their purposes and the inclinations of the computer.[3] Table 1, based upon recorded deaths of white females in the general population of the United States during 1949–1951 and the census of their population taken April 1, 1950, illustrates the essentials of a "current" life table. The figures are from the official life tables published by the National Office of Vital Statistics.

Multiple Decrement Tables[4]—The column of deaths in the life table may be split into component causes of death on the basis of ratios of specific causes to all causes as observed in vital statistics tabulations. Each age or narrow age group would be treated separately. With this arrangement, the decrements to the column of the living may now be described in terms of a number of causes instead of a single cause. This produces one form of a multiple decrement table.[5]

In the more general type of multiple decrement table, the column of the living traced from birth is split into components on the basis of newly acquired characteristics or of changes in status. For example, in the cohort of white females traced from birth, it is possible to distinguish, after the childhood period, between those who enter marriage and those who remain single. In the same way, a distinction may be made between those who become permanently disabled and those who remain active. Thus, the column of the living in the life table may be split into components on the basis of rates, specific according to age, for the acquisition of new characteristics.† The split may also be on the

* The ratio of deaths within the year of age x to the number alive at its beginning is known as the mortality rate, q_x; the ratio to the average number alive during the year is the central death rate m_x. The annual rate of loss of lives corresponding to the loss at any instant of age, per head surviving to that age, is the force of mortality μ_x.

† It may be argued that, in place of the split on the basis of newly acquired characteristics, it is more properly made on the basis of the loss of present characteristics. Thus, the single lives lose their state of singleness, or the healthy lives lose their state of health. However, it is unusual to speak of a cohort traced from birth in terms of such detailed characteristics as newly-born single white females, or newly-born healthy white males. In any event, the acquisition of a new characteristic or the loss of a present one will be recognized as a change in status.

basis of more than one new characteristic.

The split of the column of the living implies that the column of deaths will also be divided on the basis of the same characteristics. In the case of the first example in the preceding paragraph, there will be life table deaths among the single and also among those who had married, each on the basis of their own mortality experience. Similarly, in the second example, life table deaths will be split on the basis of the mortality experienced by permanently disabled lives and by active lives. An example of a multiple decrement table is shown in Table 2.

Mention may be made at this point of the single decrement tables associated with the multiple decrement tables. In each of these associated tables, only one source of decrement is used without regard to the others of the multiple decrements. Thus, for the case of the table

Table 1—Life Table for White Females: United States, 1949–1951

Year of Age	Rate of Mortality per 1,000: Number Dying Between Ages x and $x+1$ Among 1,000 Living at Age x	Of 100,000 Born Alive: Number Surviving to Exact Age x	Of 100,000 Born Alive: Number Dying Between Ages x and $x+1$	Number of Years Lived By the Cohort Between Ages x and $x+1$	Total Number of Years Lived By the Cohort from Age x on, Until All Have Died	Complete Expectation of Life or Average Future Lifetime; Average Number of Years Lived After Age x per Person Surviving to Exact Age x
x	$1{,}000q_x$	l_x	d_x	L_x	T_x	$\mathring{e}_x$
0	23.55	100,000	2,355	97,965	7,203,179	72.03
1	1.89	97,645	185	97,552	7,105,214	72.77
2	1.12	97,460	109	97,406	7,007,662	71.90
3	0.87	97,351	85	97,308	6,910,256	70.98
4	0.69	97,266	67	97,233	6,812,948	70.04
5	0.60	97,199	59	97,169	6,715,715	69.09
6	0.53	97,140	52	97,114	6,618,546	68.13
7	0.48	97,088	46	97,065	6,521,432	67.17
8	0.44	97,042	43	97,020	6,424,367	66.20
9	0.41	96,999	39	96,980	6,327,347	65.23
.	...	...	...	...	...	...
.	...	...	...	...	...	...
.	...	...	...	...	...	...
100	388.39	294	114	237	566	1.92
101	407.52	180	73	143	329	1.83
102	426.00	107	46	84	186	1.74
103	443.67	61	27	48	102	1.66
104	460.76	34	16	26	54	1.59
105	477.50	18	8	14	28	1.53
106	494.17	10	5	7	14	1.46
107	511.00	5	3	4	7	1.40
108	528.10	2	1	2	3	1.34
109	545.29	1	0	0	1	1.29
110	562.43	1	1	1	1	1.24

Table 2—Example of a Double Decrement Table, with Decrements By Death and By Disability

	Rate of Mortality per 1,000		Rate of Disability Within Year of Age per 1,000 Active	Of 100,000 Born Alive						
				Number Surviving to Exact Age x			Number of Active Lives Becoming Disabled Between	Number Dying Between Ages x and $x+1$		
Year of Age, x	Among Active Lives	Among Disabled Lives	Lives at Exact Age x	Total	As Active Lives	As Disabled Lives*	Ages x and $x+1$	Total	Among Active Lives	Among Disabled Lives
15	7.55	267	0.587	66,949	66,949	0	40	511	505	6
16	7.47	254	0.584	66,438	66,404	34	39	509	496	13
17	7.40	241	0.581	65,929	65,869	60	38	507	487	20
18	7.40	229	0.578	65,422	65,343	79	38	505	483	22
19	7.40	217	0.575	64,916	64,822	94	38	504	480	24
...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...

* Assuming no lives were disabled before age 15.

with decrements by marriage and by death, an associated table may be computed with marriage as the sole source of decrement. Associated tables have been used for studies of the special features of several sources of decrement, treating each independently of the others.

Select Tables[6]—Life insurance actuaries have developed a form of table in which rates of decrement may be set down in a two-way classification. One axis of classification is duration since acquisition of a new characteristic or of change in status; the other axis is usually attained age at time of acquisition or change. Since some selective process is present with change in status or at the acquisition of a new characteristic, this two-way classification is known as a "select table." For example, rates of remarriage for the widowed may be shown, in a two-way classification, on the basis of both age at widowhood and duration since the event. Another example of some interest is a table with rates of termination of disability related to both age at the onset of disability and its duration. Furthermore, the rates of termination may be distinguished on the basis of recovery or death.

In many select experiences, it has been observed that after some duration since selection (by acquisition of a new characteristic or change in status) the rates of attrition vary almost wholly according to attained age; in other words, the duration since selection then has very little influence on the variation of the rates. In this situation, practical considerations may lead to a consolidation of the experience, at the same attained age, for the longer durations. These consolidated rates are termed the "ultimate" experience and, when shown together with the rates for the earlier durations, constitute a "select and ultimate" table. The durations for which rates are shown separately make up the "select period." An example is shown in Table 3.

Applications to Health Problems

The life table has been used extensively in public health problems and has

Table 3—Example of Select and Ultimate Table Showing Probabilities of Remarriage During Widowhood

Age at Widowhood	Years Elapsed Since Husband's Death						
	0	1	2	3	4	5 or More	
						Probability	Attained Age
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
35	0.0201	0.0490	0.0386	0.0376	0.0230	0.0163	40
36	0.0184	0.0449	0.0354	0.0345	0.0211	0.0149	41
37	0.0169	0.0412	0.0324	0.0316	0.0193	0.0137	42
38	0.0155	0.0377	0.0297	0.0290	0.0177	0.0126	43
39	0.0142	0.0345	0.0272	0.0266	0.0162	0.0115	44
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...

Source: Myers, R. J. Further Remarriage Experience. Proc. Casualty Actuarial Soc. Vol. 36, 1949, p. 73.

also found an important place in clinical medicine.

Comparisons of Communities—The expectation of life at birth and at the older ages is frequently used to compare "health conditions" of communities. Actually, there is no single index by which to measure the "health conditions" of a community and the use of the expectation of life or any other life table statistic for this purpose places undue emphasis upon mortality.* In fact, the community with the higher expectation of life at birth may actually have the greater proportion of chronically ill simply because such persons may be kept alive for a longer period. Also, comparisons of localities in terms of expectation of life may be influenced by selective factors in migration. Thus, some areas may attract impaired lives who migrate with the hope of improvement or recovery. In the same way, the experience of the havens for the retired will be influenced by their migration. Even as an index of mortality, the life table has a fundamental weakness; the relative differences in expectation of life between two communities are by no means proportionate to those in death rates.[7] On the other hand, satisfactory comparisons may be made on the basis of life table death rates for broad age ranges.

Analyses by Causes of Death—The distribution of life table deaths according to specific causes, as in the multiple decrement table, is the first step in computing the chances of ultimate death from such causes. The desired result is obtained by summing the life table deaths from a specified cause after a stated age and dividing the total by the life table survivors to that age. Also of interest is the gain in expectation of life that may be achieved by eliminating any cause of death.[8] For this computation, the life table is based upon mortality rates excluding deaths from the specified cause, but with an allowance for a small

* Professor Ira V. Hiscock points to the need for "Better evaluation methods for measuring the levels of health . . ." with a reference to the World Health Organization Study Group of the Measurement of Levels of Health, Geneva, October 24–28, 1955. A.J.P.H. 46, 11:1377–1383 (Nov.), 1956.

increase in the rates for the remaining causes. The allowance is necessitated by the fact that those who would have died from the cause eliminated are exposed to the causes remaining.

Clinical Medicine—The technic of computing life table survivors has found an important place in clinical medicine. Two purposes are served, namely, the evaluation of therapy and as an aid in prognosis. A good example is furnished by a recent report for Connecticut which contains a table showing one- and five-year survival rates according to the kind of treatment received, the stage of the disease at diagnosis, and the primary site affected.[9] A 15-year term was used in a follow-up study of men disabled by heart disease.[10] Insurance mortality studies of physical impairments, many of which are of clinical interest, have a select form of mortality table as a standard of comparison.[11]

Hospital Studies—Life table technics have also been adapted for the study of certain hospital data. Thus, on the basis of data regarding first admissions to New York State hospitals and life tables for the general population, computations have been made of the expectation of mental disease.[12] A Canadian report describes the application of the multiple decrement table to patients in mental hospitals who are separated by discharge, death, or withdrawal from study.[13] The expected length of hospital stay for specific morbid conditions has been estimated by constructing "hospital stay" tables following the pattern for life tables.[14]

Morbidity Analyses—Reference has already been made to the use of multiple decrement tables and of select tables in disability studies. By means of the multiple decrement table, the incidence of certain morbid conditions may be estimated, in the absence of direct observation. The requisite data for the computation are a life table for the general population, the prevalence rates for the morbid condition, and the mortality among those so afflicted. Such computations have been carried out for the chances of eventually becoming diabetic and of eventually acquiring some cardiovascular-renal condition.[15]

Applications to Population Problems

In addition to employing the life table for mortality analyses, the student of population has found it a useful tool for studies of marriage, population growth, the labor force and the money value of a man to his dependents.

Marriage — The double decrement table in which attrition is by both first marriage and death is known as the "net nuptiality" table. When a table is computed with attrition by marriage alone, the result is the associated "gross nuptiality" table. By means of these tables, studies may be made of the eventual chances of marriage and the effect of mortality upon these chances. For the widowed and divorced, the nuptiality tables are generally in select form, taking account of both age at which the previous marriage was broken and the duration since then. Another form of double decrement table is that tracing forward a cohort of marriages with attrition both by divorce and by death of either spouse. Such a "marriage attrition" table permits estimates of the average duration of marriage and the chances of termination by divorce or death. The average duration of marriage in such a table, when subtracted from the corresponding figure in the associated table with death as the only source of decrement, yields the average years of marriage lost because of divorce. For first marriages, these attrition tables need not take account of age at marriage since such ages are usually within a relatively narrow range.[16]

Population Growth—The most elementary measure of current population growth is the crude rate of natural in-

crease, that is, the excess of the crude birth rate over the crude death rate. This measure is influenced by the prevailing age distribution of the population. To be free of this influence, various measures have been proposed which involve the life table, the best known of these being the net reproduction rate.[17] In these measures, the initial size of the life table cohort is compared with the number of births expected among the survivors on the basis of prevailing fertility. One such measure requires the computation of successive decrements to the single in the survivorship column of the life table for females to show the numbers marrying, the numbers remaining childless, and the numbers bearing first, second, third, and higher orders of children. Such detailed computations are limited by the data available. These measures of population growth may be computed on the basis of both current and generation life tables and like data for fertility. The generation approach has been studied intensively by Whelpton as a guide to projecting or forecasting the numbers of births.[18]

Labor Force—With rates of accession to the labor force specific for age, the survivorship column of the life table may be split to show the numbers who enter the labor force. Similarly, separations from the life table survivors in the labor force may be computed for those who leave because of disability, retirement, or death. With this detail, an estimate may be made of the average remaining working lifetime corresponding to any age.[19]

The Money Value of a Man to His Dependents—The premise is that the dependents receive the excess of a man's earnings over what he spends for himself. The computation requires, in addition to the survivorship column of the life table, an age schedule of earnings and of cost of living, and an assumed rate of interest to discount future earnings and cost of living. The scheme of computation intended to provide a measure of the money value of a man to his dependents is not appropriate to provide a measure of his value to the community or to his employer.[20]

Computations Derived from the Life Table

From the basic data developed by the life table method, computations can be made to answer a wide variety of problems involving life contingencies. Thus, by means of the life table columns of survivors and deaths, it is possible to compute the probability of surviving for any stated period and the chances of death within the year of age following some specified period. Such probabilities have been used in estimates of widowhood and orphanhood, and of migration. The probability of survival is also an essential in making population projections.[21]

With multiple decrement tables, estimates may be made of probabilities of both survival and change in status for stated periods: for example, the probability that a single woman of age 20 will be married and have at least two children before age 30, or the probability that an active life 30 years old will remain active to age 40 and then become disabled before age 50.[22] The life table may also be used if problems of survival and change in status involve two or more lives, on the assumption that the chances for the lives involved are independent.

Comment

The life table, with its amplifications in the form of the multiple decrement table and the select table, has already been applied in many ways in the analysis of problems in public health, clinical medicine, and population characteristics and trends. There will undoubtedly be

further applications of significance as the properties of the life table become more widely known.

REFERENCES

1. Jordan, C. W., Jr. Life Contingencies. Chicago, Ill.: The Society of Actuaries, 1952, pp. 1–26.
   Hooker, P. F., and Longley-Cook, L. H. Life and Other Contingencies. London, England: Cambridge University Press, 1953, Vol. 1, Chapters 1 and 2.
2. Dublin, L. I.; Lotka, A. J.; and Spiegelman, M. Length of Life. New York: Ronald Press, (rev. ed.), 1949. Chapters 1 and 9.
3. Spiegelman, M. Introduction to Demography. Chicago, Ill.: Society of Actuaries, 1955, Chapters 5 and 6.
   Haycocks, H. W., and Perks, W. Mortality and Other Investigations. Cambridge University Press, 1955, Vol. 1.
   Week, F. A. The Mortality Rate and Its Derivation from Actual Experience. Rec. Am. Inst. Actuaries 36:23 (May), 1947.
4. Jordan, C. W., Jr. loc. cit., Chapters 15 and 16.
   Bailey, W. G., and Haycocks, H. W. Some Theoretical Aspects of Multiple Decrement Tables. Edinburgh, Scotland: T. and A. Constable, Ltd., 1946.
5. Greville, T. N. E. Mortality Tables Analyzed by Cause of Death. Rec. Am. Inst. Actuaries 37:283 (Oct.), 1948.
6. Jordan, C. W., Jr. loc. cit., pp. 26–31.
   Hooker, P. F., and Longley-Cook, L. H. loc. cit., Chapter 3.
7. Dublin, L. I., and Lotka, A. J. Uses of the Life Table in Vital Statistics. A.J.P.H. 27:481 (May), 1937.
8. Dublin, L. I.; Lotka, A. J.; and Spiegelman, M. loc. cit., pp. 94–98.
9. Hill, A. B. Principles of Medical Statistics. Lancet (6th ed.), 1955. Chapter 14.
   Dorn, H. Methods of Analysis for Follow-up Studies. Human Biology. 22:238 (Dec.), 1950.
   Griswold, M. H., et al. Cancer in Connecticut, 1935–1951. Hartford: Connecticut State Department of Health, 1955.
   A Standardized Method of Reporting Cancer End Results. Bull. Am. Coll. Surgeons (July-Aug.), 1953, p. 3.
   Berkson, J., and Gage, R. P. Survival Curve for Cancer Patients Following Treatment. J. Am. Statist. A. 47:501 (Sept.), 1952.
10. Robb, G. P., and Marks, H. H. What Happens to Men Disabled by Heart Disease. Proc. Life Insur. Med. Directors of America 37:171, 1953.
11. Lew, E. A. Insurance Mortality Investigations of Physical Impairments. A.J.P.H. 44:641 (May), 1954.
    Lew, E. A., and Marks, H. H. Public Health Aspects of the 1951 Impairment Study. Ibid. 45:597 (May), 1955.
12. Malzberg, B. The Expectation of Mental Disease in New York State, 1920, 1930, and 1940. Trends of Mental Disease. American Psychopathological Association. New York: King's Crown Press, 1945, p. 42.
13. Fisher, J. W., and Clarke, E. E. The Derivation of Rates of Separation from Mental Hospitals. Rep. Ser. No. 1, Mental Health Division. Ottawa, Canada: Department of National Health and Welfare, (Oct.), 1955.
14. Robins, M., and Sachs, R. An Application of Biometry to Hospital Statistics: Hospital Stay Tables. A.J.P.H. 43:175 (Feb.), 1953.
15. Spiegelman, M., and Marks, H. H. Age and Sex Variations in the Prevalence and Onset of Diabetes Mellitus. Ibid. 36:26 (Jan.), 1946.
    Woolsey, T. D. Statistical Studies of Heart Disease; VI. Age at Onset of Heart and Other Cardiovascular-renal Diseases. Pub. Health Rep. 65:555 (Apr.), 1950.
16. Spiegelman, M. loc. cit., pp. 138 and 148.
17. Spiegelman, M. loc. cit., pp. 166–180.
18. Whelpton, P. K. Cohort Fertility, Native White Women in the United States. Princeton, N. J.: Princeton University Press, 1954.
19. Garfinkle, S. Changes in Working Life of Men, 1900 to 2000. Monthly Labor Rev. 78:297 (Mar.), 1955.
    ———. Tables of Working Life for Women, 1950. Ibid. 79:654 (June), 1956, 79:901 (Aug.), 1956, and 79:1152 (Oct.), 1956.
20. Dublin, L. I., and Lotka, A. J. The Money Value of a Man. New York: Ronald Press (rev. ed.), 1946.
21. Spiegelman, M. loc. cit., pp. 149–152, 192–195, and 241–244.
22. Jordan, C. W., Jr. loc. cit. See problems at end of each chapter.

Pretest for National Health Survey in Charlotte, N. C.

Charlotte, N. C., has been selected for a pilot test study under the new National Health Survey program of the Public Health Service. A number of aspects of a questionnaire being developed for later use will be pretested by interviews with a sample of households in metropolitan Charlotte. Field service procedures will also be tested.

The Federal Water Pollution Control Act of 1956

CURTISS M. EVERTS, JR., F.A.P.H.A., and ARVE H. DAHL, F.A.P.H.A.

This presentation of the steps about to be taken to catch up with our—until now—worsening problem of stream pollution is of far wider public health interest than that represented in the Section to which the paper was addressed. All can join the sanitary engineers in looking forward hopefully to important betterments in this—a national sore spot.

Assurance that the federal government would continue its leadership in the field of water pollution control was confirmed when the 84th Congress adopted the Federal Water Pollution Control Act of 1956. This new law, which was prepared on the basis of experience gained under Public Law 845, contains added provisions for research, training, collection of basic data, and grants for the construction of treatment works. This will strengthen state water pollution control activities and will again focus national attention on pollution problems and the requirements for their correction.

The major elements of P.L. 660 will be of interest to those engaged in public health activities, particularly since the federal interest has been expanded in an effort to cope with both current and future water pollution control needs.

The new statute:

1. Reaffirms the policy of Congress to recognize, preserve, and protect the primary responsibilities and rights of states in preventing and controlling water pollution.

2. Authorizes continued federal-state-interstate cooperation in the preparation and development of comprehensive programs for water pollution control.

3. Encourages cooperative activities by the states in (1) the prevention and control of water pollution; (2) the enactment of improved laws on pollution control; and (3) the establishment of interstate compacts.

4. Authorizes increased technical assistance to states, a broadened research program, the establishment of research fellowships, and the collection and dissemination of basic data on water quality relating to the prevention and control of water pollution.

5. Authorizes grants to state and interstate agencies up to $3,000,000 a year for the next five years for pollution control activities.

6. Authorizes federal grants of $50,000,000 a year (with an aggregate of $500,000,000) for the construction of municipal sewage treatment works. The amount of grant for any one project cannot exceed 30 per cent of the cost, or $250,000, whichever is smaller.

7. Authorizes the appointment of a Water Pollution Control Advisory Board on which the only federal member will be the Surgeon General or a sanitary engineering officer designated by him to serve on the board.

8. Modifies and simplifies procedures governing federal abatement action against interstate pollution.

9. Authorizes a cooperative program to control pollution from federal installations.

Construction Grant Program

It is significant to note that Congress was quite aware of the fact that in spite of the progress already made in the construction of public sewage treatment works, we were still losing ground in the fight for pollution control. In order

Mr. Everts, when this paper was presented, was on leave from the position of chief sanitary engineer, Oregon State Board of Health, Portland, serving as acting chief, Construction Grants Section; Mr. Dahl is the assistant chief, Water Supply and Water Pollution Control Program, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C.

This paper was presented before the Engineering and Sanitation Section of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 12, 1956.

to overcome this deficiency and to stimulate the construction of treatment works, the Congress authorized an appropriation of $50,000,000 annually for making grants for treatment works construction. The full amount authorized has been appropriated for the current fiscal year.

It is obvious, therefore, that in discharging its responsibilities under the act, the most pressing task facing the Public Health Service at the present time is to get the construction grant program under way. Inquiries already received on this phase of the legislation are a real indication of the interest of communities all over the country. While a start must be made in the administration of other important provisions of the act, the attention that will be drawn to the construction grant program will be such that the program as a whole will very likely be judged largely on the basis of the way this activity is managed.

This is a real challenge that must be met by both state water pollution control agencies and the Public Health Service, for the eyes of civic and conservation groups will be sharply focused on both the construction and enforcement programs. Should either of the responsible agencies falter, it can be anticipated that the entire program may be turned over to some other agency with full authority to act without regard for state programs, which the grants to state agencies seek to develop.

While the legislation places specific responsibilities on both the Public Health Service and state water pollution control agencies for administration of the construction grant program, allowances have been made to provide as much flexibility in procedures as possible so that state agencies can carry out their part of the operation in a manner consistent with local programs and policies.

Before the Public Health Service can make a grant offer to a municipality, the project must be certified by the state as conforming to that state's water pollution control program, and it must be further certified by the state as being entitled to a priority over other eligible projects on the basis of both financial and water pollution control needs. In general, it is planned that projects which conform to state water pollution control programs will be submitted to the Regional Offices of the Public Health Service for a determination as to whether they meet the various federal requirements of the act before they are assigned a priority by the state. However, there are no hard and fast rules about the order in which these various steps will be taken.

One of the factors that the Public Health Service must consider in reviewing an application for a construction grant is the propriety of federal aid for the project. Development of suitable criteria for making such a determination was, as you can well appreciate, not a simple matter. The criteria, which have now been established, will not be inconsistent with the central intent of the legislation—to stimulate the construction of additional sewage treatment works—but will draw the line at projects in which there is no legitimate federal interest or in which federal participation is not needed. Only experience, of course, will determine whether these criteria meet the practical needs of the program. The adopted criteria cover the following areas:

Interstate, Coastal, and Great Lakes Waters—Whether the project is required to control pollution of interstate waters, coastal waters, or waters of the Great Lakes (including tributaries of such waters contributing materially to the pollution of such waters), and such pollution is inimical to public water supplies, propagation of fish and aquatic life and wildlife, recreational purposes, or agricultural, industrial, or other legitimate water uses.

International Treaty Obligations—Whether the project is required to control pollution in meeting international treaty obligations or agreements.

Federal Impact—Whether the project involves a pollution problem substantially and adversely affected by: (1) federal installations contributing to the total municipal waste loadings; (2) a water use requirement involving national defense; (3) a federal water resource development; or (4) an influx of population to carry out federal activities.

Public Health Necessity—Whether the project involves treatment works required to abate a serious public health hazard.

Financial Burden—Whether the municipality can demonstrate that the construction of needed sewage treatment works involves an extraordinary and excessive financial burden in relation to its economic resources.

Once a project has been given a priority certification by the state water pollution control agency and has been approved by the Public Health Service as meeting the federal requirements of the act, including the criteria, the Service may make a grant offer to the applicant, subject to terms and conditions specified by the state as well as by the Public Health Service. An example of such a condition would be demonstration by the applicant of his ability to finance the remaining costs of the project after the grant award. If the applicant accepts the offer and conditions, final plans and specifications for the project are to be submitted by the applicant for approval by both the state water pollution control agency and the Public Health Service. Once this has been done, the project is ready to be advertised for bids. If the bids received are acceptable to both the applicant and the Public Health Service, the Public Health Service Regional Office will then, all other conditions being acceptable, authorize the applicant to award the contract. This procedure will make for efficient processing of applications as well as for maximum cooperation between the Service, the state agencies, and the applicants.

Once the project is under construction, payments of the federal portion of the cost will generally be made when the work is 25 per cent, 50 per cent, and 75 per cent completed, and when the project is closed out.

The construction grant program will be primarily a Public Health Service Regional Office operation, conducted in close cooperation with state water pollution control agencies. Even though the Public Health Service has specific responsibilities for administering the program during the construction period it will still be the policy to continue the traditional federal-state relationship to the maximum extent possible.

Basic Data

The directive to collect and disseminate basic data is a new provision of the act and grew out of the recommendations of the Presidential Advisory Committee on Water Resources Policy which were submitted to Congress on January 17, 1956. The following excerpt is quoted from these recommendations: . . . "Except for scattered and limited determinations made at major water and sewage facilities, there is essentially no coordinated program for measuring the biological quality of the nation's water. There are only some 220 locations where daily chemical water quality samples are taken. Compared to other basic data programs, the current program for measurement and study of chemical and biological water quality is particularly deficient, and present expenditures should be tripled over a period of five years."

All of us share the committee's concern over the lack of current, accurate information on the actual condition of

the nation's limited water resources. Much valuable information was collected under Public Law 845, the previous Water Pollution Control Act, but the fact remains that the information we do have is still woefully deficient.

As a step toward making up this deficiency, the Public Health Service is planning, in cooperation with the state water pollution control agencies, three broad basic data collection activities: (1) a national water quality basic data program related to sewage and industrial waste pollution; (2) a complete and current national inventory of water, sewage, and industrial waste facilities; and (3) a detailed basic data program related to the economics of water supply and pollution control. However, for the current fiscal year, the Service has a small appropriation sufficient only to explore a system of basic data collection and analysis. During this time the Service would like very much to know the kinds of basic data the states are most often required to supply, and wants to arrange a cooperative method of systematized basic data collection.

One of the proposed plans is to assign young engineers to work in one or more states to help collect and assemble basic data, including data now in the hands of municipalities, industries, universities and others. Another plan calls for the use of some of the new electronic equipment for analyzing and processing the data collected. In this regard, and as the Service becomes better equipped and organized to do such work, it hopes to provide services to the states in helping them with the processing of their own data. Several states have already expressed an interest in such an arrangement. These are just a few examples of the approaches that have been considered in the field of basic data collection.

One of the important things that can be done with the basic data is to initiate an approach to the economics of water pollution and its control. It is all too clear that large expenditures to control water pollution cannot be defended indefinitely on some vague concept of public health protection. Unless there is an actual health hazard involved, pollution control to protect water for other uses is very likely to require economic justification by methods not yet developed. Congress has already indicated that if those of us now administering water pollution control programs do not provide the needed basic data, it will be necessary for provisions to be made for other agencies in the federal and state governments to do so.

Interstate Cooperation and Uniform Law

Under the new act, the Public Health Service is directed to encourage: (1) cooperative activity by the states for the prevention and control of water pollution; (2) the adoption of uniform state water pollution control laws; and (3) the development of compacts between states for prevention and control of water pollution. The Service looks forward to the opportunity of working with groups dedicated to such cooperative activities. For example, the Council of State Governments is presently working on the development of water resources legislation to assist state legislatures when they convene in 1958 and 1959. The Council has asked the Public Health Service to work with it on this project. In doing so, the Public Health Service plans to work closely with state agencies so that the recommendations will accurately reflect state viewpoints.

Research, Investigations, Training, and Information

Broad new authority in research, training, demonstrations, and fellowships is provided under the new law. This expanded authority is a great step for-

ward. Unfortunately, the supplemental appropriation was not sufficient to permit any significant progress this year. It is hoped that next year it will be possible to implement such important authorizations as research grants to universities and research centers—thus bringing their vast potential to bear on the many unsolved problems in the field of water pollution control.

State and Interstate Program Grants

One of the most significant provisions of the new act provides for grants to states and interstate water pollution control agencies to assist them in expanding their own programs in keeping with growing water pollution problems. These grants, which are authorized for a period of five years, are not intended to replace state funds for water pollution control, but, rather, to stimulate greater state support of those programs. Use of federal grants for this purpose has proved effective under Public Law 845 and in a number of other fields, and there is every reason to believe they will work equally well for present water pollution control programs.

Enforcement Against Interstate Pollution

Enforcement was probably the most controversial part of the federal water pollution control legislation. The new legislation provided another opportunity for those with divergent points of view on this matter to be heard again and to express their views. These differences in viewpoint are not new, but have been registered forceably for more than a generation. There have always been groups who have favored strong centralized federal authority and others who see no federal role in this or any other field.

During the hearings on S. 890, there were few instances in which the need for some federal enforcement was not acknowledged and subscribed to in the representations made to the Congress. In fact, there were a number of persons, including members of both parties in Congress, who favored much stronger enforcement procedures than those proposed. The problem of the Congress and particularly the Public Works Committees of the House and the Senate at the outset was to enact an acceptable and workable provision which at the same time would preserve the rights of the states and provide legislation that could be administered in harmony with other federal-state programs participated in by the Public Health Service. This was not easy.

It was generally conceded by all concerned that the enforcement procedure under Public Law 845 was cumbersome and weak. Perhaps the most authentic assessment of this provision of the previous act was made by the House Appropriations Subcommittee in 1955 when it denied funds for enforcement on the basis of the act being unenforceable. The committee also denied funds for other parts of the program because of the weak enforcement authority.

Some, including members of Congress, contend that the enforcement provision of Public Law 660 is also weak: only experience will tell. It appears, however, from the point of view of the water pollution control administrator—who is trying to control and generally reduce pollution without regulation through the courts—that we now have a very good and workable act, including the enforcement mechanism. The first step in the procedure is the conference with state and interstate officials. Offering an opportunity for interested official agencies to sit around the table and attempt to reach an agreement is always a sound way to approach the solution to a problem. Similar methods are used successfully by a number of the states in intrastate matters, and there is no reason why

they will not be as effective in interstate negotiations. It would be hard for anyone to disagree with the provision that authorizes the Surgeon General to act upon the request of the state adversely affected by pollution from another state.

During the last several years, the Public Health Service has received an increasing number of requests to take action on certain alleged interstate pollution situations. Not many of these requests have come from the states, but rather from influential groups within the state and from their Congressional representatives. Within its limited resources, the Service has tried to do what it could to help in these situations.

Now that workable legislation on interstate pollution has been adopted and supported by a modest appropriation, here is what the Public Health Service proposes to do. At the outset, it is not planned to move precipitously in the field of enforcement. One of the first things to be done is to get better factual information on interstate pollution situations. Normally, when complaints or requests to members of Congress reach the Service, information on the problem is quite incomplete, making it necessary to go back to the Regional Offices and in many instances to the states for more data. In many complex situations, some sort of survey or study is necessary before a satisfactory answer can be found. Consequently, what is proposed during the next year may be more closely related to the basic data problem. Cooperative programs with the states will be developed to get factual data on interstate pollution situations and, if there are problems, to determine what corrective measures are being taken. If it is agreed that there is no problem, then no action other than keeping up to date on developments from time to time should be necessary. If, on the other hand, it is agreed that corrective measures are needed, the Public Health Service will be ready to work with the states in bringing them about. Both the Public Health Service and the states need to do this to demonstrate to the legislative bodies and the public that they do know what they are doing in the business of pollution control and that they have the courage to act when necessary.

Control of Pollution from Federal Installations

Congress indicated its intent that the federal government keep its own house in order when it added an amendment to the legislation that federal departments cooperate with the Department of Health, Education, and Welfare, states, interstate agencies, and municipalities in controlling pollution from federal installations. This is the first time such a provision has been contained in a federal statute, although there was an earlier executive order on this matter. Limitation of funds will make it impossible to do much on this program during the current fiscal year, but the Service will try to assist any states with problems concerning federal installations. During this year an effort will be made to obtain some information on the extent of these problems so that coordination of pollution control measures can be developed with the other federal agencies as soon as resources permit.

Conclusion

In the planning thus far, every effort has been made to adhere closely to the intent of the law that primary responsibility rests with the states and that the Public Health Service activities should be designed to support state activities. In a number of areas the fact has been stressed that the Service is dependent upon effective cooperation from state agencies. With such cooperation, there is no reason why the national and state programs for water pollution control should not move forward to the credit of every agency involved.

Some Factors Relating to Degree of Correspondence for Diagnostic Information as Obtained by Household Interviews and Clinical Examinations

JACK ELINSON, Ph.D., and RAY E. TRUSSELL, M.D., M.P.H., F.A.P.H.A.

A surprising finding from this study of household interviews versus clinical examinations is that interview reports from high school graduate respondents were found less likely to be adequate than from those who are not high school graduates. This is, of course, only a hint of the nature of many comparisons in this research.

In an earlier paper[1] some over-all findings were presented of a comparison between: (1) the results of a comprehensive family interview survey and a mail questionnaire check of physician's records and recollections and, (2) more importantly—perhaps for the first time on a probability sample of a geographically defined population—between the results of the interview and a thorough clinical examination of persons covered by that interview. Among the principal findings were:

That medically attended conditions, when reported in the family interview, tend to be substantially verified by replies to written inquiry of physicians attending the conditions. The proportion of over-all agreement between interview reports and physician reports varied between three-fourths and nine-tenths with the lower figure representing the degree of correspondence when physicians were not informed as to the essential content of the interview report.

That about a fourth of the conditions found on a thorough clinical examination, by specialists in a hospital setting with unrestricted access to diagnostic facilities and other specialist consultations, and judged by these clinicians to have been present at time of interview, were reported previously in the family interview. Whether conditions found by clinical examination were reported in the interview varied tremendously by diagnosis. For example, a third of the cases of diabetes, over half the cases of heart disease, and nine out of 10 cases of neoplasms (both benign and malignant) found on clinical examination were not reported in the family interview.

That so-called "overreporting" of diagnoses was apparently less of a prob-

At the time the study was conducted, Dr. Elinson was a senior study director of the National Opinion Research Center at the University of Chicago and Dr. Trussell was director of the Hunterdon Medical Center, Flemington, New Jersey. Both Dr. Elinson and Dr. Trussell are now with the School of Public Health and Administrative Medicine at Columbia University, New York, N. Y., as associate professor and executive officer, respectively.

This paper was presented before a Joint Session of the American Association of Registration Executives and the Statistics Section of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 14, 1956.

lem than "underreporting" with respect to diseases with characteristics of chronicity. For example, seven out of eight conditions classified as "mental, psychoneurotic, or personality disorders" on the basis of the family interview were substantiated by subsequent clinical examination. Family interview reported diabetes was substantiated 85 per cent of the time, and family interview reported heart disease, 80 per cent of the time. Three out of four neoplastic conditions reported in the interview were substantiated by clinical examination.

The earlier paper concluded: "the data at hand suggested that, for chronic disease, household interviews may be expected at best to provide minimum estimates of morbidity." By morbidity was meant "clinically diagnosable conditions." The setting of the study and the methodology employed were summarized in this earlier paper.

The present paper offers more detailed findings with respect to the relation of a number of characteristics of the conditions and persons in the clinically evaluated sample to the degree of correspondence between interview-reported diagnostic information and the findings of clinical examinations. Among the relations considered are: (1) those between sex, age, family income, and educational level of examined persons and correspondence between interview and clinical examination; (2) the differential verification of hospitalized conditions, nonhospitalized but medically attended conditions and medically unattended conditions; (3) the possible influence of self-report versus reporting for other members of the family; (4) variability among clinicians; and (5) for three recent independent studies—in Hunterdon County, N. J., Baltimore, and Pittsburgh—it has been possible to make some comparisons for two broad classifications of chronic disease, arthritis, and heart disease.

Self-Report Versus Report by Other Family Members—In interviewing the family, interviewers were instructed to talk personally to all responsible adult family members present at time of interview. For adults not at home and for children the interviewer was to talk to the female head of the house, and failing this, the responsible adult present who "knew most about the health of the family."[2] Since the study was not designed to provide an experimental evaluation of self-reporting versus reporting by other family members, the results must be interpreted within this limitation. In so far as the effort to interview all responsible adults at home at the time of interview was successful, selective bias in the compared groups may have been reduced.

When persons were reporting for themselves in the family interview they reported proportionately nearly half again as many more of the conditions found on subsequent clinical examination as when persons were reported for by other family members. Three out of 10 clinically diagnosed conditions had been reported in the family interview when persons reported for themselves as compared with two out of 10 when persons were reported for by others (Table 1).

Types of conditions found by clinical examination which were at least twice as likely to be reported in the family interview when the person interviewed reported for himself as when he was reported for by others included: infective and parasitic diseases; mental, psychoneurotic, and personality disorders; heart diseases; respiratory diseases; certain digestive diseases; genitourinary diseases; and skin diseases. On the other hand, clinically diagnosed diabetes and diseases of the nervous system and injuries and impairments were among condition classifications which were more likely to be reported when the person was being reported for in the interview by some other member of the

Table 1—Proportion of Clinically Evaluated Conditions Reported in the Family Interview, by Whether Person Reported for Self or by Other Family Members

Classification of Condition *	Per cent (Weighted) †		Number of Conditions Found by Clinical Examination (Unweighted) †	
	Persons Reporting for Self	Persons Reported by Others ‡	Persons Reporting for Self	Persons Reported by Others ‡
Infective and parasitic diseases	34	13	17	22
Neoplasms	19	11	29	15
Allergic diseases	66	51	18	22
Diabetes mellitus	47	96	16	12
Other endocrine, metabolic, and nutritional diseases	7	5	107	48
Mental, psychoneurotic, and personality disorders	42	17	50	52
Diseases of the nervous system	28	72	27	40
Diseases of the eye	25	17	176	100
Diseases of the ear	54	45	29	24
Heart diseases and rheumatic fever	52	24	137	114
Other diseases of the circulatory system	32	18	134	86
Diseases of the respiratory system	47	14	39	25
Dental and other diseases of buccal cavity and esophagus	8	14	67	53
Other diseases of the digestive system	40	16	67	41
Diseases of the genitourinary system	11	2	83	35
Diseases of the skin and cellular tissue	46	2	27	17
Diseases of the bones and organs of movement	36	29	97	51
Injuries and poisonings, and other impairments, including congenital	9	29	34	27
Symptoms, senility, and other conditions	12	7	20	21
Total	29	19	1,174	805

* Restricted to conditions which clinicians judged to be disabling or potentially disabling at the time of examination, or which had been disabling in the year preceding the examination, and which were believed by clinician to have been present in period covered by family interview. The concept of "disabling" used by clinicians was rather broad and did not necessarily mean that an individual was socially disabled. But by the use of this clinical concept of disability many of the less serious conditions have been excluded.

† Per cents have been weighted to reflect appropriately the differential sampling ratios used and cannot be applied directly to the unweighted numbers of conditions shown in this table.

‡ Exclusive of children under 15 years of age.

family than when he was reporting for himself.

These findings suggest that for an over-all picture of the prevalence of disease in a population a higher yield of disease reporting will be obtained when individuals report for themselves than when some other member of the family is interviewed. On the other hand, when the purpose of a survey is elicitation of information about the distribution of certain specific diseases it may sometimes be more effective to interview other adult family members rather than the person himself, depending on the type of condition about which information is being sought. No general rule as to type of condition which is more likely reported by self or other is apparent at this time. It is interesting, however, to note that "mental, personality, and psychoneurotic disorders," as

established by clinical examination, were more likely to be reported in the interview by the person himself.

As for the classification, "diseases of the bones and organs of movement" (the largest single classification being arthritis), the results of the Hunterdon study were in apparent agreement with recently published findings[8] of the Pittsburgh arthritis study that more clinically diagnosed disease was reported by individual interview than by family interview.

Some Comparisons of Hunterdon, Baltimore, and Pittsburgh Studies—Another point of comparison between published reports of the Pittsburgh arthritis study and the Hunterdon study is shown in Table 2A. Data available from the study by the Commission on Chronic Illness in Baltimore are also shown. A word about comparability of terms in the three studies is in order. In the Pittsburgh study the term "conditions" refers to household survey reports of "yes" to the questions on arthritis and rheumatism and to physician classifications of "classical arthritis" or "definite arthritis." In the Hunterdon study "conditions" refer to classification of interview reports and clinical examination findings into the broad international list grouping of "Diseases of bone and organs of movement," including primarily arthritis. In the Baltimore study "conditions" refer to classification of interview reports and clinical examination findings into the international list codes for the various forms of arthritis. The usual problems present in comparing results of this kind of study are, of course, present here—definition of terms, sampling, population, coding practices, and other study procedures employed in both the interview and clinical phases of the three studies. Undoubtedly, inter-interviewer, inter-respondent, and inter-clinician variations contribute to the total variation among the three studies cited.

With respect to arthritis the correspondence between family interview and clinical examination data for Pittsburgh and Hunterdon was fairly similar; the Baltimore data showed a higher degree of correspondence. In all three studies,

Table 2A—Comparison of Household Interview Reports and Clinical Examinations in Three Studies, for One Classification of Chronic Disease—"Arthritis"

	Hunterdon	Baltimore †	Pittsburgh ‡
"Adequacy" *			
Per cent of clinically diagnosed conditions previously reported in household interview	30	52	21
(Total clinically diagnosed conditions)	(197)	(107)	(149)
"Accuracy" *			
Per cent of household interview reported conditions subsequently diagnosed by clinical examination	56	81	60
(Total household interview reported conditions)	(138)	(91)	(146)

* "Adequacy" refers to the proportion of clinically evaluated conditions previously reported in the family interview. "Accuracy" refers to the proportion of family interview reported conditions found on clinical examination.

† Baltimore data furnished by Dean E. Krueger.

‡ Pittsburgh percentages computed from data in Table 1, page 137, as given by Sidney Cobb.[8]

Table 2B—Comparison of Household Interview Reports and Clinical Examinations on Three Studies, for One Classification of Chronic Disease—"Heart Disease"

	Hunterdon	Baltimore *	Pittsburgh †
"Adequacy"			
Per cent of clinically diagnosed conditions previously reported in household interview	39	38	13
(Total clinically diagnosed conditions)	(288)	(150)	(130)
"Accuracy"			
Per cent of household interview reported conditions subsequently diagnosed by clinical examination	80	84	70
(Total household interview reported conditions)	(166)	(88)	(97)

* Baltimore data furnished by Dean E. Krueger.
† Pittsburgh data furnished by Donovan J. Thompson.

however, the pattern of correspondence was the same in that there were proportionately more "false-negatives" than "false-positives" in the family interview when the findings of the clinical examination were taken as the criterion. Another comparison of correspondence between interview and examination is possible for the three studies, namely, for heart disease (Table 2B).

The similarity between the Hunterdon and Baltimore findings with respect to the degree of correspondence between household interview reports and clinical examinations for heart disease is striking. In both communities, one rural the other urban, a majority of heart disease conditions (six out of 10) established by clinical examination were unreported in the household interview. In the Pittsburgh study only one clinically established heart condition in eight was previously reported in the household interview. On the other hand, heart disease when reported in the household interview was substantiated by subsequent clinical examination, about seven or eight out of 10 times in Hunterdon, Baltimore, and Pittsburgh. The available evidence with respect to heart disease leads us to conclude that if it was reported in the household interview it was very likely to be present—in so far as it could be determined to be present by clinical examination (although about a fifth of the interview reports in Hunterdon turned out to be "false-positives"); but that less than half of all heart conditions clinically diagnosed in subsequent examinations were reported in the earlier household interviews.

Arguing from all three sets of data, then, "underreporting"—in the sense that not as many conditions are reported in a household interview as are found in clinical examination—appears to be a larger problem than "overreporting." In other words, household interview data on prevalence of clinically diagnosable disease are more likely to be inadequate or incomplete with respect to clinically diagnosable disease than to be inaccurate or false.

"Seriousness" of Conditions in Relation to "Accuracy" and "Adequacy" of Household Interview Reports—The "accuracy" of household interview data on disease prevalence rises with certain

characteristics of conditions which for lack of a more descriptive term may be tentatively grouped under a label of reported "seriousness." The rationale for the label is that hospitalized conditions are generally more "serious" than non-hospitalized; medically-attended more "serious" than medically unattended. (It is obvious there are many exceptions to this classification.) For hospitalized conditions three out of four reported in the family interview were substantiated by subsequent clinical examination. Excluding persons for whom only acute or minor chronic conditions were reported in the interview (i.e., the so-called "well stratum"), the proportion of substantiation was 80 per cent for conditions reported as having been hospitalized (Table 3).

It has been noted that conditions reported in the household interview as hospitalized were substantiated in relatively high degree by subsequent clinical examination. Other studies, for example, the morbidity survey in San Jose, Calif., reported by Belloc, have shown that household interview reports of hospitalized conditions check out pretty well with available hospital records.[4] Hospitalized conditions, however, represent a small fraction of conditions reported.

A further qualification should be introduced here, namely, that conditions reported on interview as hospitalized or medically attended may not be all the conditions for which persons have been hospitalized or medically attended. Reference is made to the earlier paper which showed that attending physicians reported a number of conditions for their patients about which no information was given in the interviews.

Table 3—Proportion of Family Interview Reported Conditions Confirmed by Clinical Evaluation, by Reported "Seriousness" of Condition

Reported "Seriousness"	Per cent Clinically "Confirmed"	
	All Evaluees	Excluding "Well" Persons
All family interview reported conditions	47	53
Hospitalized	73	80
Medically attended but not hospitalized	46	54
Not medically attended	34	38

While our indexes of "seriousness" of a condition leave much to be desired, the evidence is that unlike "accuracy," "adequacy" of family-interview reported conditions does not appear to be greatly influenced by "seriousness." In the Hunterdon County study the adequacy of reporting was somewhat better for conditions judged at the clinical examination not to be in need of medical supervision than for conditions judged to be needing medical supervision (31 per cent–23 per cent). Similarly, in the Baltimore study conditions classified on a scale of severity at the clinical examination showed "mild" conditions about as likely to be reported in the interview as "moderate" or "severe" conditions (26, 28, and 28 per cent).[5]

Adequacy of Household Interview Reports in Relation to Personal Characteristics of Evaluees—We turn now from characteristics of conditions to characteristics of persons for whom the interview report was made. Table 4 shows the adequacy of reporting for persons varying as to sex, age, education, and family income. Differences in adequacy of reporting for males and females were small, and for the various age groups there seemed to be no meaningful pattern, except that the most complete interview reporting occurred for the age group 15–24 years, relatively "healthy young adults."

Results for the various educational levels and by family income were somewhat surprising. Interview reports of high school graduates were less likely

Table 4—Proportion of Clinically Diagnosed Conditions Previously Reported in Family Interview, by Various Characteristics of Person Examined *

	Per cent (Weighted)	Number of Conditions (Unweighted)
Sex: Males	22	(908)
Females	26	(1,195)
Age: Under 15 years	21	(122)
15–24 years	43	(82)
25–44 years	18	(491)
45–64 years	23	(791)
65 years and over	32	(617)
Education, persons 25 years of age and older:		
Less than 8th grade	32	(180)
8th grade	31	(612)
Some high school	40	(106)
High school graduate	19	(530)
College	20	(187)
Family income:		
Under $1,000	36	(177)
1,000–2,999	28	(535)
3,000–4,999	22	(573)
5,000–7,499	17	(172)
7,500 and over	18	(159)

* Persons for whom characteristic was unascertained are not included in this table.

to be adequate than for persons who were not high school graduates. Similarly, interview reports for persons from families with higher incomes were less likely to be adequate than for persons from lower income families. It is possible, of course, that the clinical examinations for persons in the better socioeconomic groups were more thoroughly conducted (i.e., more tests, more consultations, more follow-through on tentative diagnostic impressions) than for persons in the lower socioeconomic groups. If so, this may have resulted in relatively more conditions definitely established on clinical examination for the higher than for the lower socioeconomic groups. The assumption would seem to be that there was better communication between clinician and evaluee when they were from the same or similar socioeconomic group. We have no evidence at this time to verify or disprove such an assumption. Another possible explanation of this rather surprising finding is that better educated people, in the course of giving a medical history to the clinician, were more able to recall symptoms existing at the time of the previous interview and that in the context of the clinical examination these symptoms assumed an importance which they did not have in the previous household interview. We are not satisfied with any of the plausible explanations thus far put forth. The finding is so contrary to ordinary expectations that additional analysis is indicated.

Variation Between Clinical Examining Teams—There are some data from the Hunterdon study which suggest some degree of variation as between clinical examining teams. Comparison of adequacy figures for the two internists who did all the examinations of adults shows that the proportion of clinically diagnosed conditions which had been reported in the interview was somewhat

Table 5A—Proportion of Clinically Evaluated Conditions Previously Reported in Family Interview, by Examining Physician and Various Characteristics of Examinees

	Physician I	Physician II
All persons examined by internists	29% (1,066) ‡	19% (933)
Sex of examinee:		
Male	26% (413)	18% (443)
Female	31 (653)	19 (490)
Age of examinee: *		
15–24 years	56% (44)	24% (38)
25–44 years	21 (234)	17 (257)
45–64 years	31 (455)	14 (336)
65 years and over	31 (321)	33 (294)
Educational level, persons 25 years of age and older: †		
Grade school	38% (449)	26% (343)
High school	27 (397)	15 (239)
College	27 (117)	15 (70)
Family income: †		
Under $1,000	45% (109)	26% (68)
1,000–2,999	34 (276)	22 (235)
3,000–4,999	24 (259)	20 (278)
5,000–7,499	13 (55)	17 (108)
7,500 and over	46 (55)	9 (101)

* A few persons under 15 years of age were examined by internists. These are not included here.

† Not included are persons whose personal characteristics were not ascertained.

‡ This table should be read as follows: of the 1,066 conditions diagnosed by Physician I, 29 per cent had been previously reported in the family interview. (Percentages have been weighted to correspond with sampling ratios and cannot be directly applied to the numbers of conditions.)

higher for one physician than for the other (Table 5A).

It will be seen from this table that a difference between the two internists in establishing the adequacy of the interview report was observable in most of the subgroups of examinees compared. For both male and female examinees Physician I showed a higher interview adequacy percentage than Physician II. Similarly, in all age groups but the oldest, all educational levels, and four out of five income groups the interview adequacy percentage for Physician I was greater than for Physician II. Since the bulk of assignment of persons to the two physicians for examination was essentially random, it is not likely that the explanation for the differences lies in differences among the patients examined, although this is possible. Rather there seems to be a real difference between clinicians in their reports of diagnostic work-ups. The difference in adequacy of household interview when compared with the examinations of the two clinicians seems to rest in part upon the tendency for one of the clinicians to have been more inclusive in his listing of diagnoses than the other. This statement is supported by the fact that the mean number of conditions per person found by Physician II (for whom interview adequacy was lower) was higher than for Physician I (3.5 as against 2.8), and that this more inclusive tendency of Physician II was observable for both sexes and for most age, education, and family income groups of persons examined (Table 5B).

The time lag between interview and examination did not appear to affect the interview adequacy proportions to any appreciable extent. When interview adequacy for physicians was compared on the basis of a variable other than characteristics of persons examined, e.g., time lag between interview and examination, the difference between physicians persisted (Table 6). Because of situa-

Table 5B—Mean Number of Conditions Per Person Found on Clinical Examination, by Physician and Various Characteristics of Examinees

	Physician I	Physician II
All persons examined by internists	2.8	3.5
Sex of examinee:		
Male	2.8	3.7
Female	2.8	3.3
Age of examinee: *		
15–24 years	1.7	1.8
25–44 years	2.6	2.9
45–64 years	3.5	4.8
65 years and over	3.1	5.9
Educational level, persons 25 years of age and older: †		
Grade school	3.2	5.4
High school	2.7	3.0
College	3.7	3.2
Family income: †		
Under $1,000	3.2	6.9
1,000–2,999	2.6	4.2
3,000–4,999	2.6	3.3
5,000–7,499	3.5	3.4
7,500 and over	3.2	3.5

* A few persons under 15 years of age were examined by internists. These are not included here.

† Not included are persons whose personal characteristics were not ascertained.

tional circumstances (the Hunterdon Medical Center did not open for clinical examinations until one year after the interviews were taken), no examinations were done with a time lag of less than 13 months. Consequently, it was not possible to gauge the effect of a time lag shorter than this on the degree of correspondence between interview and examination. However, in the Baltimore Chronic Illness Survey where the median time lag was much shorter—about four months—the over-all degree of correspondence between interview and examination (22 per cent) was the same as in Hunterdon where the median time lag was about 20 months.[5] No corresponding test of inter-clinician variation is available from the Baltimore study or the Pittsburgh study.

Return Rates—Something should be said about return rates. It is now a commonplace for well conducted interview surveys on large probability samples of a household population to achieve return rates of 85–90 per cent or better. The family interview in Hunterdon for example was completed on over 4,000 families, or 91 per cent of the families, in a predesignated probability sample. Approximately half the missed interviews were lost because of unavailability of respondent during the period of the survey, the other half because of outright refusals. Under federal government auspices sample interview surveys have achieved even higher rates of compliance by respondents, as evidenced by the 98 per cent return in the Baltimore survey, the field work for which was done by the Census Bureau.

The Hunterdon County study, in which a sample of persons to be clinically evaluated was drawn from a population previously observed by means of personal interview, presented an unusual opportunity to compare, on a large number of characteristics that had been ascertained by interview, persons in the

Table 6—Proportion of Clinically Evaluated Conditions Reported in Family Interview, by Examining Physician and Time Lag Between Interview and Examination

	Physician I	Physician II
Time lag:		
13–15 months	36% (145) *	16% (136)
16–18 months	33 (223)	22 (216)
19–21 months	35 (364)	17 (482)
21 months or more	19 (334)	18 (99)

* Numbers in parentheses are total unweighted numbers of conditions found in each group.

sample as drawn with persons who were clinically evaluated (Table 7). In general, the obtained clinical evaluation sample, when compared with the total clinical evaluation sample as drawn, did not appear to differ to any important degree in either personal characteristics, family characteristics, or disease characteristics as reported in the interview.

With respect to personal and family characteristics persons who were "not obtained" for clinical evaluation were somewhat more likely than persons who were obtained to be unmarried persons, especially men; older people, both men and women; single person families, both men and women; persons with less education, both men and women; and women from nonfarm families. The mean number of conditions reported in the family interview for both the obtained and nonobtained clinical evaluation samples was the same, 1.4; and the distribution of reported conditions was

Table 7—Selected * Comparisons of Drawn, Obtained and Unobtained Clinical Evaluation Samples (Data from Previous Family Interview)

A. Personal Characteristics	Males			Females		
	Drawn Sample	Obtained	Unobtained	Drawn Sample	Obtained	Unobtained
Per cent of each group who were:						
Under 15 years of age	27	32	18	25	27	19
45 years of age and older	38	32	50	31	26	45
Unmarried (over 16 years of age)	18	13	28	19	17	23
Single person families	5	3	8	5	3	11
From nonfarm families	82	82	82	81	78	90
Among persons 25 years of age and older:						
Grade school nongraduates	20	13	30	14	12	17
With some college training	19	22	16	12	15	4
(Number of persons)	(591)	(354)	(237)	(682)	(476)	(206)

B. Characteristics of Reported Conditions	Drawn Sample	Obtained	Unobtained
Per cent of conditions reported as:			
Hospitalized	10	9	10
Having left a defect	20	19	23
Still bothering	49	49	49
Diseases of:			
the circulatory system	13	11	15
the respiratory system	18	16	21
the digestive system	16	17	14
Mean number of conditions reported per person	1.39	1.39	1.38
(Number of conditions)	(3,258)	(2,171)	(1,087)

* Because of space limitations only a few selected comparisons are shown—highlighting the differences in the samples as drawn, obtained, and unobtained. More complete statistical documentation (as presented at the time the paper was read) is available in limited mimeographed supply from the authors.

quite similar as to frequency and fairly similar as to classification. There was practically no difference in the amount of reported disability due to disease between the obtained and not obtained sample.

We are currently at the point of having a relatively thorough instrument, the clinical examination, applicable to relatively incomplete, but not necessarily biased, samples (30–35 per cent unobtained cases) and a relatively limited instrument for the purpose of estimating prevalence of diagnosable chronic disease, the household interview, applicable to relatively complete samples (10–15 per cent unobtained cases). An additional consideration is the difference in dollar cost between conducting an interview and carrying out a clinical examination. In considering costs, however, the amount and kind of information obtainable per dollar should not be overlooked.

What was reported in the interview about disease was basically what was known to the general community of physicians plus a certain amount of symptomatic, unattended illness, to which the respondent may or may not have attached his own diagnosis. The magnitude of the differences between reports of family interviews and findings of clinical examinations is in large measure a reflection of the state of medical diagnosis and patient-physician communication in routine general medical care in the country today. The variation of this magnitude from one area to another, and even within areas, can be assumed to be extensive.

REFERENCES

1. Trussell, Ray E.; Elinson, J.; and Levin, M. L. Comparison of Various Methods of Estimating the Prevalence of Chronic Disease in a Community—The Hunterdon County Study. A.J.P.H. 46:173–182 (Feb.), 1956.
2. National Opinion Research Center, University of Chicago. Interviewing Manual and Training Specifications, Hunterdon Health Survey (June), 1952.
3. Cobb, Sidney; Thompson, D. J.; Rosenbaum, J.; and Warren, J. E. On Measurement of Prevalence of Arthritis and Rheumatism from Interview Data. J. Chronic. Dis. 3:134–139 (Feb.), 1956.
4. Belloc, Nedra B. Validation of Morbidity Survey Data by Comparison with Hospital Records. J. Am. Statist. A. 49:832–846 (Dec.), 1954.
5. Krueger, Dean E. Measurement of Prevalence of Chronic Disease by Household Interviews and Clinical Examinations. A.J.P.H. (To be published).

Harvard's Science Teacher Program

For a second year Harvard University will offer an eight-week course in radiation biology to high school science teachers. Twenty teachers will be selected to participate in a course offered at the Harvard Medical School in cooperation with the Graduate School of Education and the Summer School and sponsored jointly by the Atomic Energy Commission and the National Science Foundation.

Emphasis of the program is on the understanding and appreciation among high school science teachers of the tremendous advances in science made possible by modern developments in nuclear physics. Thus, it is hoped, more high school students will be encouraged to pursue careers in science. Further, through community seminars, the teacher-students are expected to pass on the enthusiasm and knowledge gained to other high school science teachers in their areas.

Applications for the program will be closed on April 1. Applicants may write to: Professor Fletcher Watson, Graduate School of Education, Lawrence Hall, Harvard University, Cambridge 38, Mass.

Major Medical Expense Insurance: An Evaluation

JEROME POLLACK, F.A.P.H.A.

The question that is scrutinized here is this: can the principles that have been adapted to insurance against such contingencies as fire, automobile collision, glass breakage, burglary, and perils of the sea be applied successfully to the pressing problem of so-called catastrophic illness?

Major medical expense insurance is the newest, most highly publicized, and fastest growing branch of health insurance in the United States today. By challenging the fundamental concepts on which earlier health insurance plans have been grounded and by forcing a reappraisal of basic objectives, it has become one of the most critical issues facing the future of voluntary health insurance.

Major medical is a form of insurance that requires the insured to assume the full cost of a segment of health care. Thereafter it reimburses him for most of the cost of a broad spectrum of health services up to a large maximum amount. These requirements derive from three fundamental premises on which the insurance is based: (1) that if minor expenditures are not insured, more can be spent for protection against major illness; (2) that small claims should wherever possible not be insured because their handling is too expensive for the benefit derived; and (3) that if the insured is made to share directly in the cost of the services he receives, he will be motivated to purchase care economically and will be less likely to request unneeded or overly luxurious services, than if they were available to him without direct cost.

To those who accept its premises, major medical insurance appears to be at once a bold, large-scale, and much needed extension of the scope and duration of health insurance benefits, a way to reverse the unrelenting increase in health insurance costs and a return to basic insurance principles.[1] Major medical insurance has won uncritical approval as a long-overdue effort to insure against chronic and long-term illness. It has been called "the most important development in group insurance in a generation."[2] It is the insurance industry's most serious bid for preeminence in the health insurance market. It is receiving unusually vigorous support from influential forces in government,[3] industry,[4] insurance,[5] and medicine.[6] Although there is some difference of opinion among its supporters as to whether it should replace the present basic coverages in the short run, many favor eventual replacement, and major medical insurance is being groomed for this role.[1]

The insurance has also been vigorously opposed[7-9] and feared as an influence that could undermine health insurance by misdirecting its effort and critically inflating its cost. It does not attempt to eliminate the economic barriers to needed care; instead it imposes economic pressures which fall unequally on its subscribers, attempting to control access to care by economic rather than medical means. It abandons preventive care as a covered benefit. Despite its preoccupation with economic incentives, it does not appear to have adequate controls to prevent a harmful inflation in the cost of health care.

The emergence of major medical insurance has thus brought into critical

focus some of the central issues of voluntary health insurance—whether it should provide reimbursement or direct service, partial or full payment, and whether it should serve as stand-by protection against financial hardship, or as a primary vehicle for financing everyday health care. A coverage invoking such fundamental issues, invested with such ambitions, and involving such risk demands the most careful and critical examination.

Origin and Development

In the horizontal sweep of voluntary health insurance in the United States which has brought protection to some 110 million people [10] its vertical growth had been left underdeveloped. Demands began to arise for more complete protection—benefits beyond hospital and surgical care, greater duration of protection, and greater assurance that the costs of care would be met. Management personnel in particular were looking for coverage that would protect them against financial hardship or ruin in the event of costly illness.

A casualty insurance company was the first to meet these demands by venturing into "catastrophic" or, to use the more modest name by which it came to be called, major medical expense insurance. The Elfun Society, an association of men in management of the General Electric Company, was the first group to be covered.[11] The initial reaction in insurance circles was "antagonistic" [12] and "dismal failure" was predicted.[11] The insurer, the Liberty Mutual Insurance Company, a leading underwriter of workmen's compensation insurance and accustomed to dealing with complete medical benefits for persons injured in industry, was not intimidated by the idea of insuring medical costs up to what was regarded as a very large amount. Workmen's compensation practice, however, could not be directly applied, because in most states compensation medicine is provided by physicians chosen by the insurance company and susceptible to more rigorous controls on utilization and cost. Instead, two other casualty insurance features were enlisted—the deductible and coinsurance clauses.

Deductibles—requiring the insured to pay for the initial portion of a loss—are standard in automobile collision, fire, and glass insurance. Coinsurance—leaving uninsured a percentage of the loss—is to be found in boiler and machinery, burglary, credit, fidelity, fire, glass, marine, and title insurance. Their application to the health insurance contingency as controls is an innovation the appropriateness and effectiveness of which must now be evaluated.

Since early 1949, when the first policy took effect, major medical coverage has spread to over seven million people * (Table 1). It is growing faster than earlier forms of insurance or prepayment at any stage of their development. It is relatively easy to institute. No new agencies have to be formed, as was necessary in establishing earlier plans. No advance negotiations have to be un-

* As of mid-1956. This is an estimate made by the author based on data supplied by a cross-section of carriers. It does not include a scattering of major medical coverage offered by a few Blue Cross and Blue Shield Plans, as such plans are generally not in the major medical field and dispute its merit. An account of one of the Blue Cross-Blue Shield experiments in major medical and considerable data are to be found in Kormes, M. Prolonged Illness Insurance. Proc., Casualty Actuarial Soc. XLI:102, 1954. See also Steenwyk: The Dilemma in Catastropic Insurance. Hospitals 28:49 (July), 1954. Unless otherwise specified, the remainder of this paper deals with the group form of major medical coverage.

Mr. Pollack is program consultant, Social Security Department, United Automobile Workers, Detroit, Mich.

This paper was presented before the Medical Care Section of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 15, 1956.

Table 1—Coverage: Group Major Medical Expense Insurance, 1952–1955, Continental United States, All Life, Accident and Health, and Casualty Insurance Companies

	Group Coverage					Individual Coverage
		Number Covered at End of Year				
	No. of Master Policies *	Total	Employees	Dependents	Premiums During Year	No. Covered at End of Year
1952	420	532,000	289,000	243,000	$ 3,200,000	156,000
1953	650	1,042,000	514,000	528,000	9,100,000	176,000
1954	1,190	1,889,000	796,000	1,093,000	18,400,000	306,000
1955: Total	2,770	4,755,000	2,235,000	2,520,000	38,800,000	482,000
Supplementing basic plans	2,170	3,925,000	1,909,000	2,016,000	30,700,000	
Without basic plans	600	830,000	326,000	504,000	8,100,000	

* Covering employees.
Source: Life Insurance Association of America.

dertaken with physicians and hospitals over the terms and conditions of remuneration, as under the service plans sponsored by medical societies and hospital associations. No facilities have to be built and staffed, as under the independent health service plans. In part, the apparent rate of growth is misleading, as much of the insurance merely extends existing policies and is thus somewhat different from instituting an entirely new plan. Nevertheless, by any standard, major medical insurance is growing vigorously and is capturing the attention of the health insurance market to a greater extent than other coverages today.

Benefit Provisions

Although there is great variation in specific provisions, it is possible to outline the general features of typical plans. Most often the insurance has been written to supplement existing coverage. Generally, the insured is required to pay a "corridor" deductible for covered expenses before the major medical benefits begin. This means that he must first draw on existing health insurance benefits if applicable. Then he must incur some such amount as $50, $100 (most often), $200, or $300 in expenses before the major medical payments begin.

About a fifth of the insurance now in force involves no basic coverage.* In such policies, sometimes called "basic," "integrated," or "comprehensive" plans, the deductible starts with the first dollar of covered expenses. The amount is commonly $50, sometimes $25, although it ranges up to $500. In competition with the customary basic plans the deductible may be waived for hospital and surgical care.

Early efforts to apply the deductible to families as a whole did not gain general acceptance. Except for accidents affecting more than one family member, the deductible is usually applied separately to each individual and the breadwinner may have to pay several times the stated deductible before the insurance relieves any appreciable portion of family expenses.

* As of December 31, 1955. Some companies are vigorously attempting to supplant the basic coverages. One ranking carrier has reported that almost two-thirds of the policies which it has written this year involve no basic coverage or replace a basic plan.

After the deductible is satisfied the insurance usually pays 75 or 80 per cent of covered expenses. In some policies a larger percentage is paid for hospital, surgical, and some other types of care, or there may be an area of full payment for such benefits. A typical maximum is $5,000 or $10,000. Usually the longest period over which benefits may be paid is two years, although some policies provide for longer periods, some have no time limits, and some renew the maximums under certain conditions.

The most impressive feature of major medical insurance is the broad range of covered services. These usually include hospital care, medical treatment, private nursing, drugs and medicines, x-ray examinations and therapy, laboratory tests, anesthesia and oxygen, blood and blood plasma, prosthetic devices and other related services and supplies. The principal exclusions are general health examinations, refractions and eyeglasses, hearing aids, care provided by governmental agencies or furnished under workmen's compensation and pregnancy benefits—although separate provision is usually made for a maternity benefit. Psychiatric care, an especially impressive feature of some plans, is more often excluded.

On intensive examination major medical policies reflect a series of compromises between the demand for broad coverage and the quest for reduced cost. A few plans offer generous protection within the precepts of the insurance; others have been denounced by A. M. Wilson, "father" of major medical insurance, for simulating broad protection but actually withholding it through high deductibles, ingenious time limits which constantly create more out-of-pocket expense, conditions requiring the deductible to be renewed for the same illness, unusual definitions, and other exclusions and restrictions. In part the variations reflect differences in concept, but they also involve major differences in cost. In many respects the history of major medical insurance has been a general retreat from the original high standards set by the Elfun Plan which did not impose any maximum time limit, included psychiatric care, and covered retired members and their dependents. Carriers are striving to produce a coverage that can be called "major medical" for as little as 60 cents per insured monthly. Retired people are generally not covered or are subjected to extra restrictions directly contrary to their needs and their capacity to make up for the gaps in insurance. By excluding the first days of life the insurance often fails to cover the sudden and substantial expenses of a premature baby—in direct violation of the precepts of a coverage specifically designed to protect people against unpredictable and large expenses.

Probably the greatest retreat in major medical insurance is the prevalent two-year limit on benefits. The danger of financial ruin is not so much from an acute flare-up of expenses in a short time, but from long-term illness. A two-year limit appears to cut out as much as one-fifth to one-third of the protection provided by a broad plan without this limit (Table 2). The time limit is likely to intervene before the large maximum benefits that are prominently featured can be paid. Conversely, however, it is fair to state that where long-term coverage is truly offered, the extension of benefits for many years is a feature hitherto not found in conventional insurance plans.

Thus far an approach to the deductible has not been evolved which satisfies major medical theory and its market at the same time. As the primary market has been among people who already have health insurance, most of the coverage is supplementary. But the usual form of supplementation is unsatisfactory. The deductible was originally intended to separate major from minor

illness, at least according to economic severity, by being set at a given level of expenditure regardless of other insurance. This approach was generally rejected because of some overlapping in basic and major medical benefits. The corridor deductible, which was usually adopted instead, eliminates duplication but no longer applies only to minor illness. Imposed after an individual has been hospitalized or has undergone a surgical operation, it amounts to a period of denial even in major illness. As the vast majority of personal expenditures for health care fall within the deductible range, the corridor leaves the insured to pay for most—sometimes all—of the very benefits nominally added by the insurance. Moreover, the tendency to graft major medical plans on deficient basic plans often puts the major medical insurance in the questionable role of making up in part for the elements that a liberal basic plan might have covered in full. On the other hand, policies designed to compete with basic plans, by offering a zone of fully paid care violate the precepts of major medical insurance that the deductible, if valid at all, should start with the first dollar and that coinsurance should be applied to all expenditures. Such policies are admittedly a "transitory form of coverage . . . to educate the buying public to the . . . necessity of . . . coverages which emphasize adequacy rather than first dollar coverage." [14]

The deductible is the most powerful factor and most controversial feature of the insurance. As in other forms of insurance, its function is to reduce the number of claims. More than two-thirds

Table 2—Duration of Benefits—Elfun Plan—Disability Years 1949–1955

Payment Year	Disability Year						
	1949	1950	1951	1952	1953	1954	1955
	Employee						
1st	$ 27,657	$ 19,987	$ 56,222	$ 65,909	$ 62,849	$ 67,393	$ 83,675
2nd	17,293	21,127	46,960	47,279	36,549	57,447	7,673 *
3rd	8,018	6,696	12,051	8,971	17,075	4,087 *	
4th	6,085	4,358	4,659	4,945	1,250 *		
5th	4,466	2,304	6,628	311 *			
6th	3,148	1,989	1,503 *				
7th	2,147	203 *					
8th	942 *						
Total paid to date †	$ 69,756	$ 56,664	$128,023	$127,415	$117,723	$128,927	$ 91,348
	Dependent						
1st		$ 43,105	$ 50,272	$ 58,543	$ 67,815	$ 67,057	$ 96,030
2nd		36,031	41,508	38,893	54,051	80,407	5,342 *
3rd		17,201	25,559	8,878	21,368	2,943 *	
4th		19,646	10,449	10,264	2,066 *		
5th		9,909	5,484	505 *			
6th		4,614	355 *				
7th		1,801 *					
Total paid to date †		$132,307	$133,627	$117,083	$145,300	$150,407	$101,372

* Three months.
† As of May 1, 1956.
Source: Liberty Mutual Insurance Company.

of the population incur total health service costs of less than $50 annually and almost three-fourths spend less than $100.[15] Accordingly, only a small minority of insured people can be expected to draw benefits under a typical major medical policy. Early experience shows that for every 100 insured people, depending on the liberality of the basic benefits, from two to six persons will receive benefits in the course of a year under a plan with a $100 corridor deductible (Table 3). This compares with about 14 hospital admissions, nine surgical procedures, at least 60 outpatient visits to physicians, 14 optical services, and still other services likely to be needed by 100 insured people in a year.[18]

Table 3—Incidence of Total Health Service Expenditures and of Claims Under Group Major Medical Insurance

	Per cent of Persons with Total Cost Exceeding Amount of Deductible Shown *	Per cent of Insured Persons Incurring Claim in a Year Under Group Major Medical Coverage †
$ 50 deductible	32	12–17
$100 "	18	8–11
$300 "	4	4–6
$500 "	2	2–3
$100 corridor deductible		
liberal basic coverage ..		2–3
narrow basic coverage ..		4–6

NOTE: The data are not strictly comparable for several reasons; items of expenditure included composition of the populations and existence of insurance. It would appear, however, that where the deductible is less than $300, fewer claims occur than might be expected from the distribution of costs because of the uninsured or uncovered expenses, the inhibiting effect of the deductible, and the fact that small bills are frequently not filed. With expenditure of $300, or over, somewhat more claims are filed than might be expected from the a priori distribution of costs.

* Based on unpublished data obtained from the Health Information Foundation National Family Survey of Medical Costs. See Anderson, O. W., and Feldman, J. J. Family Medical Costs and Voluntary Health Insurance. New York: McGraw-Hill, 1956.

† Source: Thaler, A. M. Group Major-Medical Expense Insurance. Trans. Soc. Actuaries 1:429, 1952, modified on basis of some claim experience.

As for the per cent of costs covered by the insurance, the typical $100 corridor deductible plan does not pay half or more of covered costs until the insured, after drawing on the basic benefits, has incurred about $300, or more, of additional expense; it does not pay for two-thirds or more of covered costs until there has been an expenditure of at least $500, or more, beyond the basic benefits.[16]

Small Claims

One of the stated purposes of the deductible is to "eliminate" small claims.[17] Actually, it reduces but by no means eliminates them. Nor does the deductible invariably reduce the number of small claims; a deductible of $25 or $50 would in fact increase the number of small claims for hospital expenses.[18] Table 4 illustrates the distribution of claims by amount under two different plans. Under one, with a corridor deductible averaging $150, more than one-fifth of the claims nevertheless amounted to less than $50. Even with a $300 deductible, about one-sixth of the claims were still less than $100. Nor do these figures reflect all of the separate small disbursements. Frequently, a procession of supplementary benefits are paid under the same claim, each covering perhaps three-fourths of the bill for a physician's visit or drug prescription. Once the deductible has been satisfied it may open eligibility for any number of separate small expenditures in subsequent minor illnesses.

Nor can the medical importance of small claims be dismissed. In this respect health insurance differs from other forms in which a deductible involves merely a financial loss of given magnitude. The small claim is involved in the initial decision whether to see a doctor or neglect a condition. It is

Table 4—Distribution of Major Medical Claims by Amount Two Experiences

Amount of Claim	A Corridor Deductible Averaging $150		B Elfun Plan $300 Deductible	
	Per cent Distribution of Claims Paid By:			
	No.	Amount	No.	Amount
Less than $50	21.7	2.1	6.8	0.3
$ 50– 99	18.3	4.9	10.3	1.2
100– 199	25.6	13.0	17.8	4.1
200– 299	10.8	9.5	13.0	5.0
300– 499	9.9	12.9	18.0	11.1
500– 999	7.7	18.3	17.2	18.6
1,000–1,999	4.3	20.5	9.8	21.5
2,000 and over	1.7	18.8	6.9	38.2

closely linked to the earliest opportunity the physician has to discover pathology. The doctor's decision whether or not to order a culture, a blood count, an x-ray or electrocardiogram and other measures which reduce the hazard in medical judgment, often made with an eye to the patient's means and availability of insurance is an important factor. Rather than dismissing them as "sniffle" or "piddling" claims, medical insurance should err on the side of encouraging the investigation of possible indications of pathology. The axiomatic assumption that preventive care is uninsurable [18] should not be accepted as a final disposition of this vital matter. At present, except for persons in the upper income brackets, the great bulk of the population goes to the physician only for diagnosis and treatment of manifest illness.[19] Advance payment may prove to be one of the most potent means for bringing preventive care into everyday practice.

To cover a significant portion of total health care an insurance plan cannot avoid dealing with many small items. High administrative cost in relation to minor benefits is most acute in reimbursement plans dealing separately with each episode resulting in a claim. Much of the difficulty is overcome by plans with direct physician and hospital participation which can accumulate payments due the purveyors of service or which pay on a cost or capitation basis. Thus, if pressed far enough, the undue administrative cost thesis leads merely to a demonstration of a weakness of reimbursement insurance rather than a fatal deficiency in the health contingency.

Economic Pressures

Originally, major medical insurance was designed for people who can readily budget for a few hundred dollars of care, and there undoubtedly is a segment of the population who need insurance only for costs beyond some such amount. The insurance, however, is now being extended to people who find even moderate out of pocket charges large enough to act as a deterrent to care.

All but 5–6 per cent of the families of professional, semiprofessional, and managerial employees have savings and bonds which might be applied to pay the deductible expense. But as many as 30 per cent of the families of the skilled and semiskilled, and a slight majority of the unskilled and service employees

(52 per cent) have no liquid assets at all. The difficulty in meeting a deductible falls especially heavily on the young and old—both crucial groups in their need for health services; as many as one-third of the families whose head is 18 or 24 years, or 65 and over, have no liquid assets. In all, more than half the American families would not be able to meet a combined family deductible of $500, and 42 per cent would not be able to meet a deductible of $200 out of liquid assets.[20]

Moreover, unlike salaried personnel who may not lose any wages when they are sick, when the typical workman is disabled a significant loss in unreplaced income must be added to the deductible in assessing the economic pressures which affect him. As for current income, a $300 deductible means more than a month's income for about two-fifths of the families and unattached individuals in the United States.[21]

The attempt to persuade people to budget for the uninsured costs of care runs counter to an almost unbroken trend toward greater use of periodic payments. Installment buying is no longer reserved for large purchases, such as houses and automobiles. A large segment of the population—possibly a majority—now relies on installments in paying for items within the range of the deductibles and much of the American economy depends on greater accessibility of arrangements for periodic payment. More than half the purchasers of such appliances as television sets, refrigerators, and washing machines last year used credit.[22] Within installment buying there has been a trend toward lower down payment—the deductible under the installment plan. Even middle-class families do not budget specifically for medical care.

In a recent article in Fortune Magazine,[23] they use installments to pay winter fuel bills, Christmas and birthday presents, taxes, clothing, etc. Where the vendors do not accept monthly installments, loans are used, even though the interest may make this less advantageous than the administration of small claims in an insurance plan. If major medical insurance should spread to a large segment of the population, there very likely would arise a demand for installment financing of the uninsured elements. A substantial move to apply major medical insurance to the population now without health insurance would be further beset by the conflict of trying to bring the cost down by further diluting the benefits and by the lesser capacity of those segments of the population to make up for the deficiencies.

In major medical insurance a form designed to meet the needs of people with higher incomes has been applied without modification to people with more limited means. Although statistical evidence is not yet available, it is quite clear from personal accounts that the deductible does inhibit access to care among those with lower incomes. Attempts to equalize the hardship on the lower income participants by varying the deductibles have been few and ineffectual. On the contrary, rather than accommodate the insurance to the needs of people with modest means, premiums are weighted two to three times to reflect costs for the higher earning members, and leveled over the entire group. Thus a transfer of funds occurs from the lower to higher income group contrary to ability to pay and contrary to the incidence of cost.

Cost

The premium structure is largely speculative and experience is still too scant to be conclusive.* There are great

* The source of information on which premiums have been based is a study of the distribution of costs before the insurance was inaugurated,[26] modified in anticipation of higher costs under insurance, and also as a result of early experience and benefit variations.

variations and premiums on seemingly similar coverage for employees may vary, for example, from 60 cents monthly to $1.50. The principal cost factors are income, age, and location; and there is a great amount of uncertainty about each of these factors.[24] In general, the premiums appear to have been set too high. There has been a wave of reductions averaging as much as 30 per cent in some companies.[25] Reductions of this magnitude are normally made when the ratio of benefits to premiums is about 40–50 per cent. The deductible and restrictive clauses appear to be more powerful cost inhibitors than was anticipated. However, major medical claims are characteristically light in early years and an early loss ratio of 40 per cent may signify heavy losses when the coverage matures.

Low initial costs have made the insurance deceptively attractive in its early years, especially in face of continued rate increases in plans providing fully paid benefits. Experience rating under private insurance plans leads to an emphasis on large dividends achieved often by eliminating the retired members of the group. The fact that major medical insurance is often combined for dividend purposes with other coverages, such as life and disability insurance, gives the insurers even more latitude to make the premiums attractive, as dividends from the other coverages could be used to make up for deficiencies in major medical coverage. Despite these advantages and the low initial costs, major medical insurance may ultimately prove to be a very costly venture.

Controls

Major medical policies provide that the insurer will pay only "necessary and reasonable" or "customary" charges for the services and supplies obtained. A few attempt to spell out the standards for determining whether a charge is reasonable or necessary. Most carriers, however, place little confidence in such contractual provisions. They rely instead on the insured's motivation under coinsurance and deductible provisions, a review of charges by the claims department, referral of questionable cases to the medical department, negotiations with the physician where necessary, and, as a final resort, complaints to the medical society.

The coinsurance and deductible provisions are regarded as "the most effective of all controls of the loss ratio."[27] In the words of one authority, "the only control that is effective in all instances is a financial one."[1] For practical purposes some insurers regard coinsurance and deductible as the sole controls. Coinsurance is intended: "to keep the insured vitally interested in restricting medical services to necessary ones and in retaining a financial interest in fees charged for specific services."[1] There is added insight in the observation: "Sharing in the loss takes a great measure of the burden of control off the insurer's back without restricting arbitrarily the insured's freedom to indulge his own taste, preferences, and sense of values."[27]

The confidence being placed in deductible and coinsurance exceeds their appropriateness or performance. They have been prescribed as controls in much the same spirit as the notion that if marriage licenses were made expensive enough there would be fewer divorces. As has been shown, the deductible clause has a strong influence in reducing cost by eliminating and inhibiting claims. The question is whether it is a proper control.

Coinsurance, on the other hand, is largely ineffective. This has been demonstrated statistically. A survey of hospitalization made in Michigan by the State Medical Society and the Blue Cross Plan found faulty use of hospitalization—overstay, admissions for conven-

ience, or for x-ray and laboratory tests only—in nearly 36 per cent of the admissions involving subscribers entitled to virtually fully paid care. Among the insured patients with limited benefits involving considerable coinsurance, there was faulty use in nearly 30 per cent. The difference is not particularly significant and the effectiveness of coinsurance in reducing faulty utilization is revealed to be highly questionable.[25]

The reason for a general failure of coinsurance to accomplish what is expected of it is obvious. It assumes a level of sophistication in medical matters that few patients possess. Moreover, if the uninsured percentage is small—e.g., 20 to 25 per cent—as is now true, it exerts little influence on the selection of services; if large, it might have greater impact, but the insurance would be made unmarketable.

Early in the course of major medical insurance, Alan Thaler of the Prudential Insurance Company wrote:

> If we could completely retrace the steps of the industry, our best approach to this form of coverage would undoubtedly have been through closer past cooperation with doctors and hospitals so that service type plans . . . representing a joint effort on the part of the doctors and the insurance industry, could have been made to fill the bill more generally. The further development of such plans may yet be the final answer to this whole problem, but this solution is one which unfortunately is not available at the present time. It would, therefore, seem that the insurance companies would have to run the risk of proceeding on their own if they are to provide any kind of answer now.[26]

Failing to bring the doctors and hospitals into partnership with the insurance, the attempt has been made to make the patient police claims. "The purpose of the coinsurance," Thaler says, ". . . is to identify the interests of the insured and the insurance company in incurring only those charges which are absolutely necessary. The idea of coinsurance is fine in principle, but is obviously not fool-proof. If a doctor should be willing to settle for the insurance company's share of the bill, the purpose of the coinsurance would be to a large measure defeated."

A distinguished actuary, vice-president of one of the leading underwriters of group health insurance, has stated frankly his concern over the lack of adequate controls:

> The danger . . . in major medical insurance is that it can serve to increase the general level of costs of medical care . . . the traditional measure which doctors use in setting fees is contrary to existing conditions . . . I feel that this orthodox form [of major medical insurance] lends itself to abuse . . . I have always feared that there would be high fees charged just because the insurance existed and that a coinsurance feature might be largely defeated by the doctor's waiving the portion of the charge which the insured employee is supposed to bear.[28]

The claims manager of another company writes:

> . . . when hospital confinement is not involved, there is not much control of any kind . . . the greater the benefit provided, the higher the surgical bill.
>
> Drugs in the non-hospital confinement . . . especially when there is almost blanket inclusion, are difficult to control and safeguards to prevent abuses do not appear to have been effectively designed.[29]

Mr. Wilson, in evaluating his company's experience, warned: "If Catastrophe coverage accomplishes nothing more than to provide more people with more money to pay higher bills for medical care, Catastrophe coverage will represent an economic catastrophe."[33]

These anxieties of the insurers are not a reflection on the integrity of the medical profession. They arise out of two concerns: (1) having applied a casualty insurance approach to health insurance, the known difficulties with casualty insurance cannot be overlooked; and (2) the impact of the insurance on the traditional pricing of medical services according to ability to pay must be dealt with.

The claim controls in casualty insurance are far more stringent than in health insurance. In automobile collision insurance, commonly cited as analogous to major medical, primary reliance is not placed on the deductible as a cost control. Before the insurer approves a claim for repairs, two or more bids are often required. Appraisers examine the extent of damages and determine whether charges are proper. Adjusters make arrangements which at times approximate a closed panel of approved practitioners. If similar measures were seriously contemplated in major medical insurance, the analogy so often cited would be intolerable to many of its supporters and the controls would certainly be objectionable. Despite its stronger controls, collision insurance has contributed to inflation in the cost of repairs, and the abuse of collusive waiver of the deductibles and submission of inflated bills has by no means been eliminated.

Instances of flagrant overcharges in major medical insurance are relatively infrequent but not unknown to most insurers.[30] But gross abuses are conspicuous and can be curtailed by conscientious claim work. This is where medical society grievance committees perform a significant role.

The insurance is largely defenseless against a less conspicuous but continuous upgrading of fees. This is its most serious threat and it arises out of the ambiguous status of insurance money in view of the traditional method of setting charges. Although insurance is not supposed to increase a patient's ability to pay, it does make more money available when the fee is being set.

Methods used by claims departments are not geared to enforce the provisions limiting payments to reasonable and customary charges. Normally insurers will not challenge a claim unless the fee is two, two and a half, and sometimes even three times that in a fee schedule used as a guide. For example, a subtotal thyroidectomy was performed on an individual whose income was less than $5,000. There were no reported complications. A Blue Shield plan would have paid $175 to a participating doctor who would have accepted this as full payment. According to local practice, confirmed by studies of fee levels,[31] a fee of $200 to $225 would have been generous. The doctor charged $500 and no attempt was made to question the fee. In fact the case became a major medical claim solely because of the high fee.

Another type of overcharge occurs when the patient is under "constant" care. A fee that may not appear excessive in terms of days elapsed can be exhorbitant when related to the actual number of visits and services performed.

The Texas State Journal of Medicine reports in an editorial:

> Since catastrophic coverage has been in effect, there has been an increasing higher-than-average charge (20 to 25 per cent more) per case than was true in the past.[32]

Granting all of their inherent deficiencies, the abandonment of negotiated fee schedules without the development of a suitable alternative method for setting equitable fees would seriously impair the work of the claims department and leave the patient to cope as an individual with a problem that medical societies and prepayment plans have often failed to solve.

The attitude of insurers toward major medical insurance ranges from "aggressive marketing" to a position of little confidence in the coverage. For competitive reasons some companies with decided reservations about its merits feel that they have no alternative but to write the insurance. The chief actuary of one company writes:

> . . . we do not regard this as a field to which we should devote an all out sales effort, but we do feel that it is imperative that we obtain a substantial volume of major medi-

cal business in order that we may be able to evaluate it properly . . . we feel obliged to risk a sizeable exposure on the grounds that our experience with any lesser program would be inconclusive.[29]

Some consideration is being given to the possibility of "inside limits," insertion of maximum limits for specific services. This would not be the first time that some of the very same insurers have had to retrench after overcommitting themselves. There is in fact a striking parallel between the claims made on behalf of the permanent total disability clauses in life insurance in the late 1920's, which were later withdrawn, and the present publicity on major medical insurance. If retrenchment should follow serious inflation contributed to by "wide open" major medical plans, great damage shall have been done to the voluntary health insurance movement.

Predominantly the insurance industry is inclined to regard its role as confined to reimbursement, entirely independent of medical practice. Major medical insurance, however, involves the insurer in new responsibilities. Virtually all previous health insurance written by private insurance companies restricted the insurer's obligation to limited amounts, regardless of actual cost. Under major medical insurance the insurer is now obligated to pay a fixed portion of the total cost of covered services and for large total amounts. Having focused unprecedented attention on the economic incentives of medical insurance major medical insurance is bound to contribute to a greater realization of the fact that insurance depends for its success on a sound base in medical practice. In turn, within limits, insurance influences—although it does not determine—whether a service will be performed, when it will be performed, who will perform it, where it will be performed, and, to some extent, how it will be performed. The attempt to isolate insurance from medical practice and to avoid the inescapable interrelation of the economics of prepayment and medical practice is no longer tenable. These influences will have to be more fully recognized in future health programing.

Conclusions

In major medical insurance the insurance industry is making a serious bid for preeminence in the health insurance field. It has developed a broadly inclusive coverage of considerable appeal at relatively low cost by specializing in protection against infrequent and severe illness, rather than general prepayment. It is showing great flexibility in programing. Under the most liberal forms, once the deductible has been satisfied, the insurance offers an impressive immunity against ruinous costs of long-term or severe illness.

The coverage is not a panacea for the ills of health insurance. Essentially it is an attempt to meet the problems by the traditional methods and precepts of private insurance. The attempt to insure only large and infrequent losses is partly futile, partly inappropriate, and ultimately an expression of a weakness of the form of insurance. It is a movement to make the health contingency conform to the insurance rather than make the insurance best serve the contingency.

Thus far, major medical insurance has left unsolved many basic questions concerning its own benefits, rates, and controls. Deductible and coinsurance provisions have been readily seized upon as a way to cut cost; their impact is little understood; rather than exerting a uniform influence as is now crudely theorized, deductible and coinsurance provisions will most likely demonstrate important differences in their effect on the various health services; one may prove to be misdirected, the other ineffective. The insurance is without valid controls to prevent an unwarranted in-

flation in the costs of health service.

Major medical insurance can hasten the vertical development of health insurance by contributing to a general acceptance of more inclusive and more extensive benefits. It can play an important role in stimulating competing plans to provide more complete coverage. It may prove to have specialized value for people in the upper income categories who have a greater need for financial protection against excessive costs than for general prepayment. But persons with lower income will probably continue to need coverage extending far into minor care, even if this amounts to prepayment—i.e., group sharing and advance payment of services expected to be needed—rather than insurance. For more general use major medical insurance may in time become a catastrophe rider, with or without deductible and coinsurance clauses, in improved basic plans. In the absence of more valid and effective controls for accomplishing what it seeks to do its value as a basic coverage in its own right is severely curtailed. The dilemma is that the only alternative plans available to most people also have serious gaps, deficiencies, and inadequate controls.

Major medical insurance is an attempt to design an appealing arch without a foundation. Certainly, nothing in its performance justifies abandoning the approach to health insurance that starts with joint participation by the physicians, the hospitals, and the public, relies primarily on medical rather than economic controls; and seeks to cover a large segment of needed health services.

REFERENCES

NOTE—As this article deals with a new form of insurance, many of the materials on which it is based are unpublished. Information from a representative cross-section of insurers; interviews with authorities in the field; and intensive study of plans in operation have been incorporated in the text without specific references.

1. Cody, D. D. Major Medical Group Insurance Coverages. Best's Insurance News, Life Ed. 57:6: 69–74 (Aug.), 1956.
2. Whittaker, E. B. A Dynamic Group Coverage. Major Medical Expense Insurance. Washington, D. C.: Chamber of Commerce, 1956, p. 9.
3. Folsom, M. B. Address to Blue Cross—Blue Shield Plans, Hollywood, Fla. (Apr. 8), 1956.
4. Major Medical Expense Insurance. Washington, D. C.: Chamber of Commerce, 1956.
5. Some Fundamentals of Health Insurance. New York: Health Insurance Council, 1956.
6. Lull, G. F. Insurance, Medicine and the Public. Best's Insurance News, Life Ed. 57:5:18 (Sept.), 1956.
7. Baehr, G. The Need for Medical Care. New York University Ninth Annual Conference on Labor (June 7), 1956.
8. Major Medical Expense Insurance. AFL-CIO Committee on Social Security (Jan.), 1956.
9. Voorhis, J. Shall We Spend Money for Health or Sickness? Cooperative Health Federation, 1956.
10. The Extent of Voluntary Health Insurance Coverage in the United States. Annual Survey. New York: Health Insurance Council.
11. Wilson, A. M. Origin and Development. Major Medical Expense Insurance. Washington, D. C.: Chamber of Commerce, 1956, p. 1.
12. Wilson, A. M. The Future of Major Medical. Best's Life News (Apr.), 1955, p. 27.
13. Anderson, O., with Feldman, J. J. Family Medical Costs and Voluntary Health Insurance. New York: McGraw-Hill, 1956.
14. Walker, C. N. Future A & S Policy. National Underwriter (May 4), 1956.
15. Unpublished data. Health Information Foundation and National Opinion Research Center.
16. Anderson, O. National Family Survey of Medical Costs and Voluntary Health Insurance. New York: Health Information Foundation, 1954.
17. Andrews, J., Jr. New Protection Against Major Expenses. J. Chronic. Dis. 3:4:349 (Apr.), 1956.
18. Calderone, F. A. The Economics of Preventive Medicine. Indust. Med. & Surg. (Mar.), 1956.
19. Breslow, L., and Roberts, D. W. Screening for Asymptomatic Disease. J. Chronic. Dis. 2:4:364 (Oct.) 1955.
20. The Financial Position of Consumers. 1956 Survey of Consumer Indebtedness. Fed. Reserve Bull. (June), 1956.
21. Goldsmith, S. F. Income Distribution in the United States. 1952–55, Survey of Current Business (June), 1956.
22. Durable Goods and Housing. 1956 Survey of Consumer Finances. Fed. Reserve Bull. (Aug.), 1956.
23. Whyte, W. H., Jr. Budgetism: Opiate of the Middle Class. Fortune LIII, 5:133 (May), 1956.
24. Trans. Soc. Actuaries 1:469, 1952.
25. Examples: (1) Equitable Cuts Group Major Medical Rates About 30 Per cent. Accident & Health Rev. (June), 1955, p. 19. (2) Prudential Liberalizes Its Group Major Medical. Ibid. (Sept.), 1955, p. 17. (3) Cuts Major Medical Rates. Accident & Sickness Rev. (Mar.), 1956, p. 19.
26. Thaler, A. M. Group Major-Medical Expense Insurance. Trans. Soc. Actuaries 1:429–466, 1952.
27. Paolini, E. R. Major Medical Expense Coverage. California Physicians' Service.
28. Becker, H. F. Controlling Use and Misuse of Hospital Care. Hospitals 28:61 (Dec.), 1954.
29. Quoted from letters to the author.
30. Halverson, A. B. Abuse of Health Insurance. Best's Fire and Casualty News 57:3:83 (July), 1956.
31. Lindsey, J. R. Surgical Fees Today. M. Economics 144 (Nov.).
32. Kimbro, R. W. Making Insurance Work. Texas State J. Med. 52:2:63 (Feb.), 1956.
33. Wilson, A. M. Experience with Catastrophe Medical Coverage. New York: American Management Association (May 21), 1952.

Public Health's Unmet Needs in Home and Farm Safety

CHARLES M. CAMERON, JR., M.D., M.P.H., F.A.P.H.A.

Is a matter of two decades too short a time to expect the major fulfillment of an obligation seriously proposed and as seriously accepted? About twenty years ago health officers considered and accepted the challenge that home safety be made a part of the public health administrative program. Here we are called to an accounting.

That the tragic loss in human resources from home and farm accidents each year was recognized almost 20 years ago by public health workers is a tribute to the farsightedness and breadth of vision of the men and women who pioneered the paths we tread today.[1] That home safety is now receiving active consideration by a host of different professional and lay groups is indicative of the concern for this source of community morbidity and mortality which has followed these prophetic declarations. That over 100,000 Americans have lost their lives within the walls of their homes in the past five years should suggest, however, that this can hardly be taken as an occasion to retire from further efforts against these all too common everyday occurrences.[2] That farming ranks as the single occupational group with the most unfavorable accident experience in terms of total deaths also illuminates the need for acceleration rather than deceleration in this sphere of endeavor.[3]

The growing number of public health agencies which have inaugurated home and farm safety programs within the past three to five years has provided an opportunity to assess the more fruitful of these efforts and perhaps to define some of public health's unmet needs in home and farm safety. The evolution of programing for home and farm safety by public health departments which might normally require five to 20 years has been compressed into a span of perhaps one-fourth to one-fifth this time by the concentrated exploratory demonstration programs made possible by the W. K. Kellogg Foundation. Their initital programs in local health departments were followed by three-year programs in eight state health departments which are just now completing their allotted periods. From this nucleus of activity and from the leadership given to health agencies by the Public Health Service, the National Safety Council, and the insurance industry have come an infectious stimulus which has captured the imagination and interest of a great number of public

Dr. Cameron is associate professor, School of Public Health, University of North Carolina, Chapel Hill, N. C., and acting chief, Accident Prevention Section, North Carolina State Board of Health.

This paper was presented before a Joint Session of the American School Health Association and the Engineering and Sanitation, Health Officers, Occupational Health, and School Health Sections of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 15, 1956.

health workers and allied specialists.

The need to determine just how much was being done to combat home and farm accidents led to survey activities by two different organizations within the past year. The Home Safety Inventory conducted by the National Safety Council in 1955 listed 591 agencies in the United States which in the previous year had carried out some type of home safety activity.[4] Complete objectivity requires that one point out, however, that among these organizations public health agencies were consistently outnumbered by farm groups, women's clubs, safety councils, and other organizations.

In November, 1955, a Subcommittee on Accident Prevention of the Committee on Administrative Practice of the American Public Health Association published the results of its "Survey of Home Accident Prevention in Public Health Departments in 1955."[5] Of the health departments who returned the survey questionnaires, 77 per cent indicated that home accidents were considered a public health problem and about half had specific plans for program activities in the next year. This information was sent in by about a third of the local, state, and provincial health departments queried. With considerable justification one might question whether the level of interest and activity is as high in those departments that did not respond to the questionnaire as it was among those that did.

From these two sources it is possible to infer that public health still faces a quantitative need in home safety; a need for still greater awareness on the part of health workers about the crucial health problems facing the communities of the nation. It seems elemental that a public health department whose operations were directed against the present-day forces of morbidity, mortality, and crippling would recognize home safety as a high priority program need.

One need only consult age-specific cause of death tables to learn how important accidents are to the younger segments of the population. Recent studies have shown accidents to be the leading nondegenerative health condition among the senior citizens of the population,[6] and the costs of providing medical and hospital care for both young and old rest most heavily on the breadwinner of the family. Directly or indirectly every member of the family circle has something at risk in terms of accidents. If further documentation is required, the records of crippled children's clinics, hospital emergency rooms, and even of the local fire departments clearly indicate the depths of community diagnosis in the area of home accidents.

The need for evaluation in public health, admittedly, is a cry which comes from every segment of our professional sphere and it is perhaps too easy to attribute all professional woes to this lack of candid, periodic adding-up of the score. Complete honesty dictates that much of the deficiency in arousing public health workers to take up the banner of home safety can be laid before the doors of many of us who have attempted to administer accident control programs at the state and local levels.

The public-health home-safety specialist, a category of profession which has been encountered with some frequency in the past few years, has been plagued with vocabulary difficulties of a most peculiar nature. On the one hand, he has struggled with a marked lack of precision when defining many of the terms which he uses. The tribulations confronting an individual when attempting to apply a definitive scientific explanation to what is meant by "having an accident" are considerable. Universal agreement as to a definition for "injury" has also eluded most safety workers to date. On the other hand, as with most professional categories, this

specialist has borrowed and developed a great number of terms dealing with certain aspects of accident causation and control. Accident "proneness," accident "liability," and accident "susceptibility" have been both studiously and glibly incorporated into many discussions. In our attempts to illustrate home safety opportunities open to workers at the local level we have used such terms as "integration," "coordination," and "re-education" which quite possibly have done very little to make our colleagues clearly aware of what we were trying to say.

Before passing over the initial point regarding the almost complete void in public-health home-safety activities in many areas of this country, one additional observation may be in order. While it may be said that this deficiency is partially due to a lack of appreciation of the importance of accidents by health workers and partially due to some of the efforts to describe home safety technics to them, it should be added that part of this void is due to a lack of anything being done or said about home safety in certain key segments of the professional family. This key segment may be described as the "leadership" group of public health. It is made up of the various individuals and organizations whose official responsibility is to improve standards of public health practice and performance. For many professional workers these leadership roles are filled by state or local public health associations, their cadre or corps of consultants from state health departments, and by faculty and teachers at the professional schools which prepare public health workers. In the activities and actions of many of these organizations and individuals there seems little evidence that the tremendous potential inherent in public health staffs could or should be diverted to meet the community accident problem.

In addition to this quantitative deficiency regarding home and farm accident control, public health would seem also to be facing certain qualitative deficiences in this area. In a great number of the local health departments where home and farm accident control activities have been initiated careful efforts were made to establish accident control not as a nursing program, not as a sanitation program, not as a health education program, but as a team activity. Early in the evolution of accident prevention programs it was apparent that skills from the entire spectrum of public health disciplines would be essential if this "disease" were to be attacked on a broad front. Inservice training activities, postgraduate short courses, programs for professional associations, articles in specialty journals, all these steps were taken to interest the various members of the public health organization in the unique opportunities for each in home safety. That the reception of some of these groups has been less than warm is perhaps only a slight exaggeration. In many health departments home safety is considered a nursing activity or perhaps the exclusive responsibility of health educators. Not that these efforts are not in themselves worth while; however, the labeling of any program as the distinctive property of any single discipline is not conducive to interesting others in their possible opportunities in this area.

If, indeed, the prevention of home and farm mishaps involves a two-pronged attack on personal and environmental accident hazards on both a community and family basis, then cooperative efforts by administrators, public health nurses, sanitarians, and health educators is a prime prerequisite to any wholly successful effort.

The hamstringing of safety efforts by failure to mobilize a full force within the confines of the health department has been compounded by the lack of utilization of full community safety re-

sources in many health department safety activities. Relatively speaking, public health is a late arrival on the safety scene and within almost every city, town, and village there are organizations and individuals who have been attempting to combat accidents for many years. The resources inherent in industrial safety programs, local safety councils, municipal fire departments, and agriculture extension programs were cited earlier as valuable allies in planning and conducting meaningful safety programs, yet at this present time the location and facilities of these agencies are unknown to many public health workers.

It has been said that the safety movement in America has been characterized by a multitude of small independent programs and activities each designed to combat some single type or group of accidents. Many of these activities have been placed in the position of having to compete with other safety projects for public attention, support, and interest and one suspects also that there may be considerable duplication of personnel, funds, and activities among these super-specialized endeavors.

The role of the local health department as an impartial coordinator of all these community safety interests was envisioned as one of the unique contributions public health might make to the entire safety movement. Regretably, in many of the cities and towns one still finds the traffic safety council, the police and fire departments, the industrial safety activities, the water safety programs, and others, each pursuing its separate course side by side with scant realization of the results that might accrue through cooperative planning and efforts. In addition to making our own efforts less productive, this shortsightedness has created an extravagance which neither public health nor safety organizations can afford.

The final unmet need concerns a deficiency of a much more subtle nature. It is perhaps a need which is shared with a host of other safety specialists not only in the area of home and farm safety, but also in the fields of motor vehicle safety, industrial safety, and others. Raised here is a question basic to the very foundations upon which safety programs have been based. Stated plainly, it is: have the safety technics evolved thus far been evaluated accurately as to their actual potential in the prevention of accidents?

Traditionally, safety activities have been heavily seeded with informational and promotional programs. Tremendous efforts over the years have been poured into short-term campaigns, safety drives, promotional programs utilizing the media of public information, and literally millions of dollars have been spent on pamphlets, booklets, and posters. In launching community safety activities this influence has strongly colored the efforts made by the public health agencies. We have been all too quick to busy ourselves in planning additional campaigns, in preparing yet one more safety booklet, and in urging the interested citizens of the community to add one more special day or week to an already overcrowded calendar. Newspaper articles, radio spot announcements, and safety proclamations have flowed from health departments in an almost endless stream in some areas of this country. Is it not fair to ask at this point whether these are the things which actually prevent accidents? Is it not candid to ask if anyone has even attempted to determine just which of these efforts do actually change human behavior toward safer living?

Admittedly, it might not have been wise to delay the beginning of public health safety programs until this question could be answered, but every effort should be made to arrive at this answer with as little delay as possible. In the meanwhile, it would seem that all safety

workers must face honestly the fact that a great amount of what has been done and what is being done violates much of what is known about educational patterns. We have spoken in a very learned fashion about the role which deepseated emotional influences may play in the causation of an accident-liable individual, yet in the same breath we have advised nailing up a few posters in order to change these ingrained personality traits. We have proclaimed that the keenest tools of epidemiologic search and research must be utilized to detect the intricacies of the accident pattern in the community and at the same time we have loosened broadsides of safety propaganda hoping to hit those individuals who may be experiencing accidents. Many have said that safe living is a way of life, yet we have tried to motivate individuals to adopt this new way of life in the same way that efforts are made to entice the public to try a new kind of toothpaste or a new type of can opener.

In so doing we have overlooked some of the fundamental precepts upon which the very profession of public health is founded. One can find no evidence that in the early days pit privies or typhoid immunizations were sold through superficial attempts to gain public attention. On the contrary the gains made against most of the major health conditions—where public health has been successful—have been through activities of a more basic educational nature. Much of the education has been on a person-to-person, face-to-face basis, and has been possible only after the public health worker has gained the personal confidence and understanding of the individual and family with whom he or she is working. It would seem that this type of program holds the greatest promise and perhaps constitutes another of the unique contributions which public health may make to the safety movement.

In a presentation of this type it is all too easy to become the prophet of despair. In pointing out only obvious weaknesses in our home and farm safety activities in health departments it would be possible to overlook a tremendous amount of extremely worth-while effort. Despite the fact that home safety may not have wedged its way into the busy programs of all health departments, the home safety scene in America at the present time is an immensely busy one. Even within one state one finds it impossible to learn of all that is going on. At almost every scientific meeting new research and new activities are reported, so that just keeping up becomes a major task.

It goes without saying that steps are now being taken to remedy a great amount of the unmet need in this area. The number of state health departments offering consultant services in this program are increasing rather than decreasing. The accident control program of the several official and volunteer agencies at the national level are expanding and committees are at work attempting to resolve the knotty nomenclature problems of the safety worker. A worthwhile program of laboratory-centered research to determine many of the factors involved in the epidemiology of accidents has been under way for some years and there is promise that support for an equally active program of community-centered research soon may be available. Within the past year, through the forum provided by these annual meetings, as well as through other efforts, the poison control center has gained wide acceptance as one method to approach one of the most tragic types of accidents on the home and farm scene.[7]

One may say with certainty that those who, many years ago, suggested that public health might have a stake in the control of home and farm accidents must experience a great feeling of ful-

fillment at the developments of recent years, and it is to be hoped that they would feel considerable enthusiasm and confidence at the deliberation with which public health approaches its unmet needs in home and farm safety.

REFERENCES

1. Godfrey, Edward S. Role of Health Departments in the Prevention of Accidents. A.J.P.H. 27:152 (Feb.), 1937.
2. Accidents Facts. Chicago, Ill.: National Safety Council, 1956, p. 12.
3. Ibid. p. 80.
4. Home Safety Inventory 1955. Chicago, Ill.: National Safety Council, 1955.
5. Home Accident Prevention in Public Health Departments, 1955. Report of 1955 Survey, American Public Health Association Subcommittee on Accident Prevention, Committee on Administrative Practice, November, 1955.
6. Cameron, Charles, and Campbell, Agnes. Accident Prevention for Older People. Nursing Outlook 4:332 (June), 1956.
7. Wheatley, George M. The Public Health Problem of Accidental Poisoning: A Condensation of a Symposium. A.J.P.H. 46:951 (Aug.), 1956.

World Health Day, April 7

"Food and Health" is the theme selected by the WHO for World Health Day, April 7. Because the emphasis is on food and the relation of food to health, UN's Food and Agricultural Organization is cosponsoring World Health Day.

The U. S. Departments of Health, Education, and Welfare; Agriculture; and State are also observing the theme in programs dealing with nutrition, food production and distribution, and food protection and sanitation. The theme is also being used as a recruitment aid—to encourage young Americans to consider careers in nutrition and other food and health programs.

An interagency committee, headed by Henry van Zile Hyde, M.D., chief of the Public Health Service's Division of International Health, is planning the government's activities. In cooperation with the National Citizens Committee for WHO a special kit of materials has been prepared for the use of industries and voluntary groups that plan to observe the day.

World Health Day commemorates the anniversary of the adoption of WHO's Constitution. The differing themes chosen each year encourage countries to improve various types of health programs. The three most recent themes were "Destroy Disease-Carrying Insects," "Clean Water Means Better Health," and "Health Is Wealth."

The Food and Drug Administration Regulations as They Pertain to Foods Processed by New Methods

MALCOLM R. STEPHENS

One point brought out in this discussion will be of the widest possible interest. Except for the recent "pesticide" amendment, there is nothing in the general food and drug law to require food additives to be proved safe before use. The law is not preventive, it is punitive only, imposing penalties after the additives have been found harmful. This is the second of five papers on "Recent Advances in and Studies of New Methods of Food Processing." * The remaining three will follow serially in succeeding monthly issues.

In the light of the tenor of the broad discussion here, as reflected by the assigned topics, my comment on the food requirements of the Food, Drug, and Cosmetic Act will be restricted to those having some relationship to the safety aspects of foods processed by new methods or with new ingredients, or packaged in new types of containers.

The Federal Food, Drug, and Cosmetic Act defines a food as adulterated if, among other things: (1) it contains a poisonous or deleterious substance which may render it injurious to health; or (2) it contains any poisonous or deleterious substance that is not required in the production of the food or that can be avoided by good manufacturing practice; or (3) where it is so required or cannot be avoided, it exceeds the tolerance prescribed by the secretary of this department; or (4) its container is composed in whole or in part of any poisonous or deleterious substance which may render the contents injurious to health.

In the recent past there have been two important amendments to the law in this area. While the law as originally written refers to "any food" in section 406(a), the so-called Miller Amendment, or pesticide amendment—setting up procedures to deal specifically with the establishment of pesticide tolerances on raw agricultural commodities—takes these foods out of the general class of foods covered under section 406(a) and makes them specifically subject to the requirements of the amendment. The amendment provides for the establishment of noncontroversial tolerances without hearing and reserves for hearing only those questions which cannot be resolved satisfactorily by informal discussion or by referral to an advisory committee of scientific experts. The amendment assigns agricultural func-

* Use of Antibiotics for the Preservation of Fish and Sea Foods. J. W. Boyd; H. M. Bluhm; C. R. Muirhead; and H. L. Tarr. December, 1956.

Mr. Stephens is director, Bureau of Enforcement, Food and Drug Administration, U. S. Department of Health, Education, and Welfare, Washington, D. C.

This paper was presented before the Food and Nutrition Section of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 13, 1956.

tions to the secretary of agriculture and health functions to the secretary of this department.

It is no longer required, before establishing a tolerance, that this department determine the necessity of the pesticide for which a tolerance is sought. In place of such a finding the Department of Agriculture certifies as to the usefulness of the article in agriculture and estimates the probable residue which will remain when the pesticide is used as directed. With this information and data supplied by the individual who requests the tolerance, this department determines what residue may be tolerated without hazard to man.

While the original law provided that tolerances for necessary or unavoidable poisonous or deleterious substances were to be prescribed by the secretary after public hearing, another amendment to the law this year has changed the procedure to one in which the secretary, when the facts warrant, may establish noncontroversial tolerances without hearing and, again, as in the case of the Miller Amendment, there are reserved for hearing only those questions which cannot be informally resolved.

In prescribing a tolerance the law directs the secretary to take into account the extent to which the poisonous or deleterious substance is required, or cannot be avoided, in the production of each food and to the ways in which the consumer may be affected by the same or other poisonous or deleterious substances. In every event the secretary has the obligation under the law to prescribe the tolerances at such levels that the public health will be protected. It seems without question that it was the clear intent of the Congress to go further than merely to insure that no single food will itself carry enough poison to jeopardize the health of the consumer. The purpose was to safeguard the nation's food supply so that the over-all quantity of toxic substances in all the items that make up the varied diet characteristic of the American people will be held at safe levels.

An essential element of proof common to these provisions is that the substance in issue is poisonous or deleterious. Unless that fact is known, the law does not operate; surmise that it might be poisonous is not enough. If knowledge of toxicity does not exist, it is not possible to specify limits of safety and no tolerance can be established. We might consider action under the provision against any food's containing a poisonous or deleterious substance which may render it injurious to health. Here we run into the second element of proof required by this provision—proof that the quantity of the substance present is such as may render that food injurious to health. Unless the substance has been sufficiently tested to give a clear picture of the degree of its toxicity, there is bound to be an area of uncertainty within which the quantity of the substance may fall and where no action to protect the public can be taken, notwithstanding the fact that no one knows whether or not the food is injurious. The zone of uncertainty is widened when the substance is used before quantitative methods for its determination in the food have been worked out.

For a half-century the federal Pure Food Law has been concerned with poisonous or deleterious food additives. Where do we stand today on a matter so vital that it might well be termed "the cornerstone of consumer security"? It can be summed up in this way. Advances in food chemistry and food technology have brought about a tremendous increase in the use of various kinds of additives, but except for the fairly recent pesticide amendment there is nothing in the law that requires that these additives be tested and found safe before they are put on the market. The law in this area is not preventive—it is merely punitive, imposing penalties on the use of those

additives which have been proved to be harmful. The backlog of research needed to establish safety of all the additives has grown to a point where it far exceeds the resources of any government agency. For example, a recent survey on the Food and Drug Administration research program on coal tar colors indicates it will take 25 years for our present staff to complete the study.

Eleven bills were introduced in the last Congress to require the testing of new chemical additives for safety before they are put in foods. Hearings were held by the House Committee on Interstate and Foreign Commerce, taking a course that unfortunately resulted in stalemate. The hearings did bring out the differences in the bills, and in spite of disagreement, showed a wide area of agreement as to the objectives which should be attained. This makes it possible to focus attention now on resolving the differences in a law that will give adequate public health protection.

One of the problems which we will have to deal with is the so-called grandfather clause to exempt from the testing requirements additives which for a long time have been and are now in use. There is no doubt that some kind of grandfather clause is necessary to exempt those additives which are generally known to be safe. It would be unnecessary and a hardship to require elaborate scientific tests to be conducted or repeated on such chemicals as vitamins, for example, on which we already have extensive pharmacologic data.

The department went on record, however, as opposed to any form of grandfather clause which would have the effect of exempting from the testing requirements chemicals which have not previously received the approval of the Food and Drug Administration or which are not generally recognized by competent, expert authorities as safe for their intended use. Obviously this is the only position which the government can take without being derelict in its duty to protect the public.

At hearings in the last Congress, Commissioner Larrick testified that the Food and Drug Administration is willing to have the tolerance principle of the pesticide amendment extended to food additives generally. This was a far-reaching step. It means abandonment of the so-called "per se" rule and would be a modification of the necessity rule. It would mean that any chemical additive—even a known poison—could be used in a harmless amount, provided it would serve some useful purpose in production or be of benefit to the consumer. In our opinion, this is a scientifically sound position. It has been endorsed by a number of scientific bodies.

If safe tolerances can be established for pesticides, they can certainly be established for other food additives. The food and chemical industries through millions of dollars spent in research have made great technical progress under the "per se" rule. They have been able to develop and use a large number of nontoxic additives. Now we are ready to have the door opened to a large increase in the number of possible additives, including some which would be harmful unless used in carefully controlled amounts. But is it unreasonable to require that when a toxic material is being added to the nation's food it should serve some truly useful purpose? Let us remember we are not dealing merely with a wider marketing opportunity for chemical compounds.

The pharmacologists tell us that because their tests are conducted largely with laboratory animals it is not possible to determine with complete certainty that chemical additives will be harmless to man. There is always a residual risk in permitting use of even small quantities of poisons in foods to be consumed by the young, the old, the sick, and the well. We believe we should be able to consider all the facts—the

facts of usefulness as well as toxicity—when making the important decision whether to allow a toxic material in the nation's food supply. When the material is not toxic we are willing to waive the criterion of utility.

There is one more controversial issue on this chemical additive legislation. That is the question of procedure in regard to court review, which I shall not attempt to discuss other than to say that we believe the scientific question whether an additive has been shown to be safe for consumers should be decided initially by qualified scientists, with any doubt resolved in favor of the consumer.

We are not discouraged about the prospects for this essential legislation. It is greatly needed. Consumers and industry alike need the protection which mandatory pretesting will provide. When the Congress convenes in January there will be a new opportunity to work for adequate and practical legislation.

Army Preventive Medicine Residency

The Army's first formal residency training program in preventive medicine is scheduled to begin July 1, 1957. Regular Army Medical Corps officers or qualified civilian physicians who accept commissions in the Regular Army may participate in this three-year program. The first year will be devoted to a course in military preventive medicine at the Walter Reed Army Institute of Research or an equivalent graduate course in preventive medicine or public health at a civilian university. The second year will be spent in an approved civilian residency training program in a health department—city, county, district, or state. The third year, which may be omitted for certain individuals with previous military experience, will consist of formal military residency training at a large Army post and a small amount of time at a nearby Army headquarters under the supervision of the preventive medicine officers. Three years of practice in the specialty will establish eligibility for American Board of Preventive Medicine examination.

Military personnel should apply for this residency program through appropriate channels; civilian physicians to the Chief of the Personnel Division, Office of the Surgeon General, Department of the Army, Washington 25, D. C.

Engineering Aspects of the Disposal of Radioactive Wastes from the Peacetime Applications of Nuclear Technology

JOSEPH A. LIEBERMAN, Dr.Eng.

One watches with an appreciation akin to awe—and not entirely unmixed with grave concern—the growing engineering achievements in meeting the ever-deepening problem of disposal of radioactive wastes. This paper will bring reassurance to all of us in public health.

The handling and disposal of radioactive wastes is a general problem the thread of which runs through the complete fabric of peaceful nuclear energy operations. In the peacetime, day-to-day application of the benefits of nuclear energy the disposal of wastes potentially represents the major "nonbeneficial" effect on the public and its resources. Therefore, it is probably this segment of the operations that is of greatest direct interest to the public health profession. Waste materials in either gaseous, liquid, or solid form are evolved in essentially all operations associated with nuclear energy facilities beginning with mining of ore, through feed material production, reactor operation, and chemical reprocessing of reactor fuels. Because of the nature and characteristics of the radioactivity involved, its ability to cause damage to human tissue, and its potential danger as an environmental contaminant, the safe handling and final disposal of nuclear energy wastes are integral and important aspects of these operations. This importance is attested to by the efforts expended in the atomic energy program to date. More money probably has been spent, and more scientific and technological effort concentrated, on facilities, operations, and research and development with regard to this industrial waste than on any other industrial contaminant we have known.

It has been said a number of times that the widespread peaceful and beneficial application of nuclear technology will depend to a considerable degree on our ability to find practical solutions to problems of waste handling and disposal. While it reasonably can be argued that no industry can be considered a mature segment of our economy unless and until it handles and disposes of its wastes in an acceptable manner, there is sufficient basis for the belief that the nuclear energy industry can develop in a rational way without being "bottlenecked" by its wastes. This conviction should not, however, carry the implication that specific answers are immediately available. Much research, development, pilot-plant testing, and field evaluation have yet to be done before

Dr. Lieberman is sanitary engineer, Engineering Development Branch, Division of Reactor Development, U. S. Atomic Energy Commission, Washington, D. C.

This paper was presented before a Joint Session of the Engineering and Sanitation, Laboratory, and Occupational Health Sections of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 16, 1956.

firm engineering conclusions will be possible for all situations.

It is important to emphasize early that the disposal of radioactive wastes, from an engineering and environmental standpoint particularly, cannot be considered as a single problem with a single, best solution. The great variation in the characteristics of the waste products from various processes and operations, including half-life, chemical state and concentration, physical nature, the quantities of materials involved, and the specific location of the nuclear facility are all important in assessing the significance of the hazard and in establishing engineering design criteria for their handling and disposal.

One of the major objectives of our engineering in this field is control over the radiation hazard from these wastes. Obviously, this involves control over the movement or mobility in the environment of the waste products themselves. This introduces the two basic waste disposal concepts that are applicable to the waste problem in its broadest sense. The radioactive materials may be permanently confined or isolated within restricted areas, away from people and their resources. This is the concept of "concentrate and contain." On the other hand, the radioactivity may be irreversibly reduced to safe levels by dilution in nature. This is the concept of "dilute and disperse." For example, with suitable environmental conditions certain types of laboratory liquid wastes in which the concentration of radioactivity is only a few times greater than drinking water standards may be disposed of under the latter concept. At the other extreme highly active liquid wastes originating from the chemical processing of irradiated fuels must be handled under the former philosophy. For all practical purposes the waste materials evolving from the chemical processing of irradiated fuels contain, by far, the greatest concentrations and total quantities of radioactivity and constitute the bulk of the long-term technological problem of waste disposal. It should be emphasized, however, that the fact that wastes containing smaller quantities of radioactivity may be amenable to direct dispersal in the environment makes it inherently important to control such operations carefully to assure that the safe capacity of the environment is not exceeded.

So much for background and philosophy. Now, what specifically, are these radioactive wastes we are concerned with? How do we handle them at the present time and what are some considerations for the future?

Characteristics of gaseous or airborne particulate wastes vary widely depending on the nature of the operation from which they originate.[1] In gaseous form they may range from rare gases, difficult to remove, such as Argon (A^{41}) from air-cooled reactors, to highly corrosive gases, such as hydrogen fluoride (HF) from chemical and metallurgical processes. Particulate materials (aerosols) may be organic or inorganic and range in size from less than 0.05 microns to 20 microns. The smaller particles originate from metallurgical fumes caused by oxidation or vaporization. The larger particles may be acid mist droplets which are low in specific gravity and may remain suspended in air or gas streams for longer periods.

An outstanding feature of air cleaning requirements for many nuclear energy operations results from the extremely small permissible concentrations of various nuclides in the atmosphere. Often removal efficiencies of the order of 99.9 per cent or greater for particles less than one micron in diameter are necessary. These criteria are much more stringent than heretofore encountered in industrial hygiene engineering, and in the early days of the industry, could not be met by the general indus-

trial dust control equipment then available. This situation was met by a research and development program that encompassed fundamental studies on the characteristics and behavior of aerosols, the design of specialized equipment, and the evaluation of the dispersion of these materials into the atmosphere. As a result of this program such air cleaning units as high-efficiency filters capable routinely of removing 99.95 per cent of particles 0.3 microns in diameter were developed and put into commercial production. A packed tower unit which utilized the chemical reaction between iodine and silver nitrate and capable of removing I^{131} from gas streams with efficiencies greater than 99.99 per cent was designed and put into successful operation and other special air cleaning devices were developed. The principles of atmospheric diffusion and dispersion were quantitatively evaluated to the point where these factors could be utilized in the over-all design of gaseous waste treatment facilities.

Some aspects of future air cleaning problems which require further technical effort include high-efficiency filtration at temperatures above 1,000°–1,500° F and, if very short-time cooled fuels are processed, even more efficient removal of iodine. The question of the biological role of a discrete, individual radioactive particle is still under active consideration and its resolution might well influence the performance criteria of engineering facilities designed to control particulate effluents. Nevertheless, for the most part, handling and disposal of gaseous wastes from nuclear facilities is amenable to practical engineering control.

Solid radioactive wastes, such as nonusable contaminated equipment, nonrecoverable scrap, and contaminated trash produced in all operations do not constitute a serious technical problem. However, if inadequate provisions are made for their proper handling and disposal they could be a distinct nuisance and, under certain circumstances, even a hazard. The levels of radioactivity associated with solid wastes may vary from a few times background to quantities requiring substantial shielding or remote handling. The engineering of systems for handling and disposal of solid wastes has been relatively simple. Burial of such wastes under known, controlled conditions and, in specific instances, disposal at sea have successfully and safely handled the problem.

Established burial grounds for solid radioactive wastes exist only at large atomic energy production and development sites, such as Oak Ridge, Idaho, Savannah River, Hanford, and Los Alamos. These facilities are in isolated areas with detailed geology and hydrology generally favorable to burial ground location. Within AEC, the operating establishments other than those noted above usually consist of relatively small areas and are in or near densely populated sections with perhaps less favorable geology and hydrology. In these cases the general procedure is not to dispose of wastes on site but to ship to one of the established burial grounds for final disposition.

In this latter connection we are confronted with the problem of locating another suitable burial ground (or grounds) to facilitate and reduce the cost of these operations. This situation is most pressing in the northeastern United States where, at present, the only available disposal sites are Oak Ridge and the Atlantic Ocean. It is generally felt that solid waste disposal facilities should not be indiscriminately scattered around the country. (The proposed AEC regulations on standards for protection against radiation do permit "on-site" burial of very small quantities of radioactivity, however.) Accordingly, AEC staff is now engaged in investigations directed toward the establishment of a solid waste handling and disposal facil-

ity to service the northeastern United States. How such a facility will be operated has not yet been decided, but in so far as technically and administratively feasible commercial participation will be encouraged.

To date relatively small quantities of radioactivity (estimated in the range of hundreds of curies, with the major contributions coming from Brookhaven National Laboratory, Bettis Field, and the University of California Radiation Laboratory) have been disposed of at sea. In these instances this has been a safe, practical method of disposal. However, among other things, the costs of sea disposal operations, including shipping to port, etc., appear to preclude the widespread use in this country of this method over burial.

Incineration of combustible, solid wastes to reduce volume and facilitate ultimate disposal has been practiced to a limited extent. The engineering and economic advantages of incineration over other approaches, including compressing, baling, and direct burial have not been demonstrated but concentration by burning may be practical in specific circumstances. A special unit to burn 30 pounds per hour has been developed by the U. S. Bureau of Mines and is now being put into operation at the Harvard Air Cleaning Laboratory in connection with final development of a suitable air cleaning component. Where quantities of activity associated with solid wastes are low the use of a "solid dilution" approach, i.e., disposal into a municipal or institutional incinerator may be acceptable. This problem is now being considered in some detail by a special subcommittee of the National Committee on Radiation Protection of the U. S. Bureau of Standards. An NBS handbook on this subject is the objective of this subcommittee.

Liquid radioactive wastes are evolved in all nuclear energy operations from laboratory research to full-scale production. As previously indicated, it is important to differentiate between what we call a "high-volume, low-level" waste, for example, the contaminated laundry waste which may contain say a few microcuries of radioactivity per gallon, and a "low-volume, high-level" waste resulting from chemical processing of nuclear reactor fuels which may contain up to 1,800 or more curies per gallon. Although both categories are radioactive wastes and both are liquid the similarity ends right there. The engineering problems of handling and disposing of these two categories are entirely different.

Liquid wastes with low concentrations of radioactivity originate in laboratory operations where relatively small quantities of radioactive materials are involved—ore and feed material processing, the normal operation of essentially all reactors, particularly water-cooled types, and the routine operation of chemical processing plants. These low-activity wastes, under proper environmental conditions, are susceptible to either direct disposal to nature or to disposal following minimum treatment. Treatment processes used include co-precipitation, ion-exchange, biological systems similar to sewage treatment methods and others. Because of their relatively high volume (on the order of millions of gallons per day) total costs for treatment may be substantial. Therefore, to the extent that it is absolutely safe, maximum use is made of dilution factors that may be available in the environment and that can be assessed quantitatively. This points up the importance of proper site selection for nuclear energy facilities and the necessity for quantitative data concerning the environment.

High-activity liquid wastes associated with the chemical processing of reactor fuels, as already indicated, constitute the bulk of the engineering problem of disposal of radioactive wastes. It should

be pointed out clearly that these wastes do not come directly from the reactors themselves, although under the improbable conditions of reactor malfunction some high-activity waste material may result. In the future such wastes also may be associated with certain types of homogeneous reactor sites to the extent that continuous fuel processing right at the reactor is envisaged. At the present time, however (and very likely for the immediate future), chemical processing plants are essentially the sole source of the wastes. Production scale chemical plants are presently located at Savannah River, Hanford, and Idaho.

Chemical processing of reactor fuels is done to separate and recover unfissioned or unburned fuel from the desired product and the wastes. At the present time, this means for the most part separating uranium, plutonium, and fission products. The fission products which constitute the "hot" component of the wastes are radioactive elements ranging in mass number from 70 to 162. From an environmental standpoint the more troublesome of these elements include strontium, cesium, and others in the rare earth series. In the solid fuel element prior to separation (which is today generally an aqueous chemical process) the concentration of fission products ranges from 100 to perhaps 1,000 ppm. In the course of processing the fission product concentration is considerably diluted by solvents, water, and other solids. The resulting liquid wastes streams are, therefore, quite dilute as far as mass concentration of fission products is concerned. However, as previously stated, because of the high specific activity of these elements, these wastes may contain quantities of radioactivity up to several hundreds of curies per gallon. The effective life of this radioactivity may be measured in hundreds of years. These wastes also may generate heat to the extent of 10–50 Btu per gallon per hour.

The quantity of high-level wastes generated depends largely on the chemical and metallurgical characteristics of the fuel being processed and the specific nature of the chemical process involved. It may range from 0.1 gallons to 5.0 gallons per gram of uranium processed. On a total volume basis it is estimated that we have to consider waste production rates of the order of a few tens of millions of gallons per year. The accompanying table gives the characteristics of a high-activity waste from processing materials testing reactor fuel elements.

FIRST CYCLE WASTE CHARACTERISTICS
MTR FUEL ELEMENT PROCESSING

Specific Volume, l/Kg U.	413
Aluminum Nitrate, *M*	2.1
Nitric Acid, *M*	0.9
Sodium Nitrate, *M*	0.1
Mercuric Nitrate, *M*	0.002
Density, g/cc	1.35
Total Radioactivity, Curies/gallon	1.9×10^3
Heat Generation, Btu/(gal) (hr)	25 (½ β, ½ γ)

NOTES: Calculations based on following conditions:
1. 20 per cent burn-up.
2. 120 day cooling.
3. Prior to jetting from evaporator.

From the viewpoint of the sanitary engineer it is perhaps misleading to apply the term "disposal" to current methods of handling highly radioactive liquid wastes. With only minor exceptions these wastes are not "disposed of" but are stored in specially designed tanks. Since the effective life of the fission products constituting the wastes may be measured in terms of hundreds of years, it is apparent that tank storage is not a permanent, long-term answer to the disposal problem. The latter point is accentuated by the fact that the capital cost of tank storage varies from about 30 cents to roughly $2 per gallon capacity.

What then, are the possibilities for disposing of the high-level wastes? First,

based on various estimates on the growth of nuclear energy in this country one can calculate the total cumulative quantity of radioactivity to be disposed of at given times in the future. Depending on whose nuclear energy growth estimates are used the radioactivity accumulations range from about $3 \times 10^9 - 2 \times 10^{10}$ curies in 1965 to about $4 \times 10^{11} - 1 \times 10^{12}$ in the year 2000. Now, when one considers the generally extremely low maximum permissible concentrations of radioactivity in air and water it becomes apparent that there is not enough dilution available in nature to enable any practical, continuing dispersal of these wastes into the environment. The application of the dilute and disperse philosophy does not appear to be a possibility.

A possible exception, but somewhat academic at the present time is disposal at sea.[2] Some oceanographers have indicated that based on general knowledge of the behavior of the ocean deeps (12,000–15,000 feet depths) and marine biology, it appears that substantial quantities of radioactivity may be disposed at these depths safely. They also indicate that much detailed oceanographic work is required before actual sea disposal criteria could be established. This present lack of detailed oceanographic information coupled with the complete loss of control of the material once it is disposed, the complex engineering problems, and high estimated costs involved in handling, transporting, and actual placing of these wastes in the ocean deeps leads once to the conclusion that sea disposal is probably a secondary possibility at this time.

Several practical approaches to ultimate, safe disposal of high-level wastes appear possible.[3] These possibilities are briefly described below. Work on these approaches is being carried out at a number of AEC installations.

Fixation in Inert Media—The objective is to fix the radioactive waste material, i.e., the actual fission products, in an inert solid carrier so that the possibility of migration of the radioactivity into the environment is eliminated or reduced to acceptable and safe limits. The carrier containing the radioactive material could then be permanently stored or buried in selected locations without deleterious effect on man or his environment. Fixation on clay, incorporation in feldspars, conversion to oxide elutriation of oxide fixation of elutriant are examples of systems under development.

Special Separation of Specific Isotopes—Because of the particular radiotoxicity and long half-life of Sr^{90} (25 years) and Cs^{137} (33 years), the removal and separate fixation and handling of these two isotopes would substantially reduce the effective life of the remaining material and facilitate its final disposal. With Cs and Sr removed the possibilities of safe disposal into the environment under controlled conditions are greatly increased. The economic utilization of the Cs, particularly, is an added incentive to such separations. Since Cs has fairly energetic β and γ emissions and a 33-year half-life it is a useful radiation source.

Direct Discharge to Selected Geologic Formations—Preliminary evaluations indicate the possible technical feasibility of direct disposal of highly radioactive liquids into the ground following somewhat similar practices in other industries, but taking into account the unique characteristics of radioactive wastes. It may be practical to dispose of the wastes underground in some cases without any treatment, into such formations as: (1) spaces prepared by dissolution in salt beds or salt domes; (2) deep basins (5,000–15,000 feet in depth) containing connate brines and with no hydraulic or hydrologic connection to potable waters or other potentially valuable natural resources; and (3) special excavations in selected shale formations.

There are a number of engineering problems that must be solved before final engineering of a prototype installation utilizing the above schemes is possible. In the fixation schemes the requirement for equipment to withstand highly corrosive media, to control highly active aerosols which are evolved, and which can be operated remotely with absolutely minimum maintenance is no small order. Progress along these lines is being made, however. In the separation of specific nuclides the outstanding requirement is the high degree of separation required in order to handle the remaining material essentially as a low level waste. Decontamination factors of the order of 10^6 are necessary, i.e., 99.9999 per cent removal of Cs and Sr. Here, too, progress is being made. In the direct disposal systems questions relating to the physical and chemical reactions between the wastes and the formation material, control of thermal heat due to radioactive decay, and potential transport problems have to be answered. Work along these lines is now in its beginning stages.

One aspect of the over-all subject of waste disposal which deserves special note is that of site selection for nuclear energy facilities.[4] It should be emphasized here that it is essential in any evaluation of, or attack on, the problem of wastes to integrate fully the varying conditions of site. This may seem like an obvious statement hardly requiring emphasis; nevertheless, it is surprising to observe the past instances in other industries in which such integration was not properly carried out and resulted either in increased costs or problems of environmental contamination. It is gratifying to note the positive attitude prevalent in industry today with regard to these problems. In planning for the expansion of the nuclear energy industry special emphasis should be placed on this point of site selection. This important consideration accounts for our continuing, close, day-to-day working relationship with the meteorologist, geologist, hydrologist, and associated disciplines.

Specific note must also be made of the administrative aspects of the operation of the nuclear energy industry, including control, regulations, and public relations. The various disciplines in public health, through experience, are particularly cognizant of the importance of these considerations. They also recognize the very close tie-in between these factors and waste handling and disposal, and the vital necessity for a firm base of scientific and engineering information on which they can establish rational administrative criteria and procedures.

Changing technology is a characteristic of the nuclear energy business. New reactors, new fuel elements, new chemical processes, and new uses of radiation may have a profound effect on the nature of the waste problem and its solution. In the future it will become perhaps even more important to maintain a close working relationship between the nuclear engineer, the chemical engineer, the sanitary engineer, and the environmentalist. To my knowledge no other industry has faced the challenge of the diverse problems in waste disposal that is in front of the nuclear energy industry. But we who are working on this fascinating and challenging problem look forward to the future of our industry with courage and confidence. In this scene the public health profession has its part to play and its contribution to make.

REFERENCES

1. Silverman, L. Air and Gas Cleaning for Nuclear Energy Processes. International Conference on the Peaceful Uses of Atomic Energy. Paper 871 (June), 1955.
2. The Biologic Effects of Atomic Radiation. Summary Reports. National Academy of Sciences-National Research Council (June), 1956.
3. Wolman, A.; Gorman, A. E.; Lieberman, J. A. Disposal of Radioactive Wastes in the Atomic Energy Program. Washington, D. C. 400, undated.
4. Gorman, A. E. Significant Environmental Parameters in the Selection of Sites for Atomic Energy Plants. Annual Convention, American Society of Civil Engineers (Oct.), 1956.

Chronic Disease Services in Local Health Departments—Report of a Survey

JONAS N. MULLER, M.D., M.P.H., F.A.P.H.A., and EDWARD B. KOVAR

"As you see," one respondent in this survey concluded, "we have a great many services, from the health department and from other agencies, but no chronic disease program." That seems a fair commentary on the general picture revealed by this study.

With the growing concern in recent years over the newly evident burden of chronic disease and disability has come evidence of interest in the role of official health agencies in alleviating this burden.[1] The particular coincidence of the interests of the American Public Health Association and the Public Health Service in assessing this role led in 1955 to assignment of the Subcommittee on Chronic Disease and Rehabilitation of the Association's Committee on Administrative Practice to the task of obtaining information about the extent and nature of chronic disease activities currently participated in by local health departments. It was hoped that this information would provide a basis for sound planning and for development of a comprehensive program guide to chronic disease services.

Practical considerations—limitations in staff, time, and funds and the stated objectives of the assignment—suggested that detailed field study of specific chronic disease activities be preceded by an over-all review of such activities as carried on with the participation of those local health departments known, or considered most likely, to be involved. A purposive sample of 271 full-time departments was selected, therefore, and a mail questionnaire distributed.

Briefly stated, an attempt was made to identify the full-time departments which were known to be participants in some chronic disease activity by virtue of reports by or about them in the literature of recent years, or from their state health departments. It was further assumed that all departments serving urban communities of 100,000 or more people were likely to be involved. At least one local department was arbitrarily selected for each state not otherwise represented in the sample:

Eight basic criteria were established for selection of the departments:

1. Probable participation in community chronic disease surveys: Departments in this group were selected on the basis of listings of community surveys contained in the 1953 and 1954 editions of the Health Information Foundation's "Inventory of Social and Economic Research in Health." It was assumed that health departments in surveyed communities would probably have a special interest in chronic disease.

2. Chronic disease activity reported to the public health service: Seven categories of service were chosen as indicators of an "advanced" position with regard to health department acceptance of responsibility in the chronic disease field. The departments listed in the 1952 Public Health Service "Report of Local Public Health Resources" as having programs in more than one of these fields were selected for circularization. (The seven service categories were: (a) special rheumatic fever and cardiac clinics or facilities; (b) special cerebral palsy clinics or facilities; (c) cardiovascular clinics; (d) diabetes clinics; (e) diabetic group instruction; (f) epilepsy clinics or facilities; and (g) bedside nursing for cancer patients.)

3. Communities known by members of the subcommittee to have undertaken programs in the chronic disease field.

4. Activities of community welfare councils in the chronic disease field: Departments were chosen on the basis of activities of the welfare councils of their communities as reported in "Welfare Council Activities in Chronic Illness Planning," Chronic Illness Commission, 1951.

5. Provision of general medical care services: Departments in this group selected for inclusion were among those listed in the 1950 study published by the American Public Health Association's Subcommittee on Medi-

cal Care, entitled "General Medical Care Programs in Local Health Departments." (Since all counties in Maryland have full-time health departments and conduct general medical care programs, not all of them were included in the survey. Those that were, were selected on the basis of one of the other criteria listed.)

6. Complete state representation: At least one local department was chosen arbitrarily in the few states not otherwise represented by local health units selected according to the preceding five criteria.

7. Urban centers with more than 100,000 population: All city departments serving at least 100,000 persons, as well as county departments containing a city with 100,000 persons, which had not been selected for inclusion on the basis of the other criteria listed, were included in the survey sample.

8. Specific mention in the literature: Departments in this group were chosen for circularization if they were named individually, in either the periodical literature or unpublished reports, as having organized chronic disease programs or having a specific interest in some aspect of chronic disease activity.

It will not require a statistician to point out that the survey sample was not in any sense either random or representative of the local health departments of the United States. We must emphasize that this sample was not intended to be representative. One hundred and eighty-seven (or 69 per cent) of the 271 departments circularized returned questionnaires.* Public health owes thanks to all of these departments and their health officers.

General Findings

Possibly, one evidence of the frankness with which health officers answered this questionnaire is the fact that 80 departments did not offer a clearly positive answer when asked, "Does the department consider activities in the field of chronic disease one of its major responsibilities?" Forty-four departments actually answered "No." However, almost 60 per cent of the respondents did say, "Yes." As one might expect, the latter group showed participation in a wider variety of services. Possibly a more interesting finding for future planning is the fact that the margin of difference is not great for many services.

All of the departments surveyed, whether or not believing chronic disease to be a major public health responsibility, exhibit a fairly wide range of activities bearing upon chronic disease prevention or management. All of these departments are involved to a considerable extent in one or another aspect of the more traditional public health programs which bear upon the prevention of chronic disease or disability but are not usually thought of in that category, i.e., tuberculosis and syphilis control programs; prenatal care to prevent toxemia of pregnancy, cardiac death or disability in the mother, congenital disability; rheumatic fever control in the child health program; crippled children's services. Only 11 departments of the

* The respondents represent 13 per cent of all full-time local health units in the nation and include 70 municipal health departments (26 per cent of such departments in the United States), 103 single county units (13 per cent of all such units), seven local health districts (3 per cent of all such districts), and seven state health districts (7 per cent of all state health districts providing local health services, Table 1). Forty-five of the 47 states with organized local health departments are represented.

As anticipated, the responses were much higher from units serving population groups of 100,000 persons or more. Complete coverage was obtained of cities listed as having populations of 500,000 or more persons and operating independent city health departments in 1950. Two-thirds of the municipal departments serving urban populations between 100,000 and 500,000 responded to the survey. On the other hand, our sample includes only four of the 119 city departments serving municipalities of 50,000 or fewer persons and only 22 of the 523 single county units serving similar populations (Table 2).

Dr. Muller is professor and director, Department of Preventive Medicine, Public Health, and Industrial Hygiene, New York Medical College, New York, N. Y. Mr. Kovar is assistant director, Regionalization Study, Health Division, United Community Services of Metropolitan Boston, Boston, Mass.

This paper was presented before a Joint Session of the Health Officers and Medical Care Sections of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 16, 1956.

Table 1—Full-Time Local Health Departments in the United States in Chronic Disease Survey Sample—by Type of Department

1	2*	3†	4
Type of Department	No. of Departments	No. of Respondents	Per cent of Responding Departments
All	1,442	187	13
City	266	70	26
Single County	807	103	13
Local Health District	267	7	3
State Health District	102	7	7

* Based on Directory of Full-Time Local Health Units (1955 Revision). PHS Publication No. 118. Washington, D.C.: Gov. Ptg. Office, 1956.

† Type as defined by the respondents. (The figure for single county units, as a result, includes seven departments stated to be local health districts in the directory. Since the local health officer apparently reported only for one county in each of these districts, the department's report was classified with the single county units. Correction of these figures would yield little change in the percentage which respondents represent of United States departments in each category.)

187 respondents have an administrative unit specifically devoted to chronic disease activities.

Relatively greater involvement in chronic disease activities was found in 60 departments responsible for administering either: (1) a general medical care program, (2) one or more hospitals, or (3) both a general medical care program and hospital. Important deficiencies found in this group of departments highlight some of the problems in the development of health department chronic disease services. For example, less than one-half of the departments directly concerned with a general medical care program employ their own social worker, nutritionist, statistician, or statistical analyst. The majority do not routinely provide consultation to the local office of the state vocational rehabilitation program.

Over 60 per cent (124 departments) of the 187 respondents are directly responsible for their local school health program. Our own general experience suggests that there is little correlation between this responsibility and the acceptance of responsibility for parallel health programs for either younger or older age groups—for example, programs for prevention or management of defects in vision or hearing in either preschoolers or adults. Thirty-six local departments said that they "conduct an occupational health program with special attention to chronic diseases and disabilities . . ." while less than one-third of the responding group reported promotion of in-plant health services in local industry.

Services to the Community as a Whole

Planning and Coordination of Services—Basic to the health departments' responsibility in planning is knowledge of the nature and extent of a problem and the resources available to meet it. Over 60 per cent (114) of the responding departments had conducted or assisted in community surveys of chronic disease problems, needs, services, or facilities. Most of these departments have seen the survey findings actually put to work. Among the results have been new and more detailed studies of special problems, the development of a community rehabilitation program or a treatment facility for alcoholics, and the

reorganization of community nursing services.

In addition to general community surveys, many local health departments in our study have carried out one or more special studies and projects in the chronic disease field. Mentioned, also, are special morbidity studies in cancer, heart disease, diabetes, cerebral palsy, and mental illness. The need for nursing homes and other convalescent facilities, for rehabilitation programs, for long-term care for children—all are areas receiving some study. Mention is also made of demonstrations in bedside nursing care, in multiphasic screening, and in ambulatory or home care for tuberculosis patients.

Only half the departments (94) obtain any sort of current morbidity data relating to chronic illness and disability, other than those for tuberculosis or syphilis. Many of these obtain such data from the state health department. Few make use of the information which might be available in the records of their own public health nursing service, the Visiting Nurse Service, or from local hospitals or physicians. Perhaps the small proportion of positive responses to questions on current morbidity information relates to the fact that only 54 departments (less than 30 per cent of the respondents) employ a statistician or statistical analyst.

Successful coordination demands current knowledge of the services in the community available for persons with chronic illness or disability. Most of the departments know about most of the services available in other agencies. The responses, however, reveal that homemaker and housekeeping services are not available in almost one-half of the communities served by the respondent health departments. Sheltered workshop services are said to be unavailable in 76 of the 187 communities surveyed and an additional 19 departments said they had no current information on availability. What is surprising is that a significant, though small, number of departments say that they do not have current information about such other services as special diagnostic and treatment clinics,

Table 2—Number and Percentage of Full-Time Single County and City Health Departments in Chronic Disease Study, and in the United States,* by Size of Population Served †

1	2	3			4		
		Single County Units ‡			City Departments		
Population Served (Approximately)	Total Responses	No.	Number of Respondents	Per cent of Responding Departments	No.	Number of Respondents	Per cent Responding
All Departments	187	807	103	13	266	70	26
0 – 50,000	30	523	23	4	119	4	3
50,001 – 100,000	38	156	21	14	70	11	16
100,001 – 500,000	95	115	51	44	59	39	66
> 500,000	24	13	8	62	18	16	89

* The number of local and state health districts in the United States by population class was not available to the authors when this table was prepared.

† Population estimated as of January 1, 1955. The 1950 census data extrapolated to January 1, 1955, with adjustments made on the basis of state totals as estimated by the Bureau of the Census as of July 1, 1954.

The authors are indebted to Miss Josephine R. Campbell, Analysis and Reports Section, Division of General Health Services, Public Health Service, for information on the population size of counties and cities covered by full-time local health units.

‡ See footnote †, Table 1.

casework agencies, rehabilitation centers, vocational rehabilitation services, nursing homes, general or special hospitals.

How do these selected departments promote the development and strengthening of these and other needed community services? Almost all of the departments claim some activity—ranging from health department representation on the local health and welfare council to attendance at staff meetings of other agencies. The health officer, director and supervisors of nursing, and the health educator are the health department personnel most frequently mentioned as participating in the planning activities and boards of many voluntary agencies. Local chapters of the American Cancer Society, American Heart Association, National Foundation for Infantile Paralysis, the Red Cross, local rehabilitation centers, voluntary hospitals, and the health committee of the local Chamber of Commerce—all received specific mention as organizations in which representatives of the local health department play a part in stimulating interest and action around chronic disease problems and in coordinating programs and services around the needs of patients. One health officer noted that there were 147 agencies with which the health department worked through the local council of social agencies. Several departments listed their work in relation to chronic disease institutions, as well as their general and professional education programs among their promotional activities.

In commenting on coordination of services for continuity of care a few respondents made note of the use of the telephone as an important liaison device, as well as of organized referral systems. In general, health departments appear to employ many of the same technics used for strengthening community services to help coordinate these services. Mentioned prominently in this connection by these respondents were the working relationships established with other community agencies, such as the welfare department, the Red Cross, the American Cancer Society, and the local vocational rehabilitation agency. Continuity of care is achieved by one department in this group through a program which involves regular follow-up of the department's patients by public health nurses, with consultation on findings derived from the follow-up procedure being provided to the family physicians and other community agencies concerned with particular cases.

Another important component of coordination as a health department responsibility is the extent to which the public health nursing service has available and makes use of specialized personnel both within its own department and in other agencies. It is evident that a good deal of coordination is achieved through the public health nursing service, since our respondents indicate both availability and use of personnel of many disciplines, most of whom do not work for the local health department. For example, 164 departments indicate the use by the public health nursing service of the social worker (only 34 health departments employ such a worker); 137 departments say that the public health nurse has the services of a nutritionist available (only 40 employ a nutritionist); 79 departments include a health educator on their staff while 122 say they make use of a health educator's services. It may come as a surprise, in view of the marked shortage in this field, to note that 70 per cent of the departments (131) claim that the public health nurse has available and makes use of the services of a psychiatrist as well as of a psychologist, "as required." The latter phrase may be the key to the high proportion of positive responses.

Responses to this question on the use of other services by public health nurses

again emphasize the severe shortage of homemaker or housekeeper personnel. However, most of the departments (134) say that the services of a physical or occupational therapist are available. Home teachers are stated to be available to 119 departments in relation to programs for handicapped children.

Almost 70 per cent (127) of the departments say that they participate with other community agencies in consideration of problems that are not specifically health problems. Again, many make special mention of their role in the council of social agencies. Other agencies include a human relations council, housing commission, youth board, recreation board, advisory committee to the local welfare department, and the board of education. Health departments indicate concern with population trends, juvenile delinquency, drug addiction, unmarried mothers, aging, general education, urban redevelopment, job placement, and general social planning. A special concern is suggested in regard to the development of adequate social casework services to help cope with the social, economic, and emotional problems related to chronic illness. It may be pointed out that 140 of the 187 departments did not employ a social worker at the time of our study.

Community and Professional Education—Less than half the respondents (79 departments) employ their own health educator. Nevertheless, a larger proportion carry on some public information service concerning chronic disease and disability, using traditional health education technics. Materials supplied by the state health department, and some from voluntary agencies, are distributed. Local health department staffs prepare exhibits for the county fair, for schools, and for other public buildings. Emphasis has been placed on heart disease, obesity, diabetes, and cancer, as well as the more traditional subjects of tuberculosis and syphilis. The health officer and his nursing staff are available to speak on chronic disease at public meetings. Films and other material for such meetings most commonly are obtained through the state health department. In one community the health department has assisted in organizing a regular "health information day," which is utilized for disseminating material on chronic disease, as well as other health subjects, to the public.

Participation in professional education on chronic disease appears to be limited to a small number of departments—less than half. In addition to activities, similar to those mentioned for the general public, some health departments accept a large measure of responsibility at local professional schools, helping to plan curriculum and to staff part of the program. Health departments also play a part in the postgraduate education of nurses and occasionally physicians, through inservice institutes. While a goodly proportion claim to provide some opportunities for education and training of their own staffs in the principles of chronic disease control, these opportunities do not appear to be part of a consistent program. Actually, the state health department appears to play a large role, particularly in making available inservice orientation in nutrition and, more recently, in social work.

Despite the fact that over 40 per cent of the departments employ a dentist, the dental profession seems to receive very little attention in the health departments' professional education programs on chronic disease. One health officer said that he considered such education the job of organized dentistry—a comment of interest because no one had offered such comment in relation to the continuing education of physicians or nurses. Most health departments claimed active support of educational programs on fluoridation. At least one department indicated vigorous opposition in its nar-

rative.* One-quarter (51 departments) of all respondents had managed to achieve a fluoridated water supply in their communities by 1955.

Laboratory and X-Ray Services—Urinalysis for albumin and for sugar are available in two-thirds of the sampled departments. Blood sugar determination is only offered through one-third of the departments as a regular procedure. In a few of these the determination is carried out routinely when blood is drawn for an initial serologic test.

A still smaller proportion of departments make available cytologic tests for cancer. It is interesting to note that almost as many offer cytologic studies of sputum (45 departments) as of cervical smears (49 departments). About two-thirds of the departments noted that chest x-rays were routinely read for cancer and heart disease. A significant proportion of the laboratory tests are apparently made available to the local area by the state health department laboratory.

Consultative, Standard-Setting, and Regulatory Activities—Over the country as a whole cooperative relationships between local health departments and vocational rehabilitation agencies have not been too well cultivated—by either agency. It is gratifying to note, therefore, that 55 respondents (29 per cent of the total) provide medical consultation to the official vocational rehabilitation agency. This consultation is more usually available on a request basis than as part of a periodic review of problems. In a few instances the local health officer is the local medical consultant. The Office of Vocational Rehabilitation and the Washington State Health Department tell us that participation by local health officers in the rehabilitation program is most helpful, particularly when the health officer has had appropriate orientation. In Washington all local health officers serve as the local medical consultants to the vocational rehabilitation program.

In view of the findings of one of the authors in a study of health and welfare relationships,[2] it is somewhat surprising to find that more than two-thirds of the responding departments indicate that a reciprocal relationship exists with local welfare departments. The health departments (123) provide consultation to the local welfare authorities in connection with the health problems of public assistance recipients. One hundred and twenty-five departments say that the welfare agency provides consultation on the economic problems and welfare status of health department patients. It is our impression that most of these relationships are informal and not based on specific policy. This does not necessarily make them less effective when they occur. While most of these consultations are between the field nurse and the caseworker, through their supervisors in some cases, there are reports of the use of staff conferences for group consultation.

One-half, or fewer, of the respondents have undertaken, or been assigned, responsibilities for maintenance or improvement of the care of chronically ill patients in community institutions. The largest number (108 departments) is involved in regulation and inspection of institutions, but often this relates only to sanitation. All too often, even this activity, in our experience, is limited to inspection for technical compliance with the law. About one-third of the departments license one or another type of facility for the long-term patient. The same proportion play a part in the establishment of standards for patient care in such facilities.

Consultative services to institutions are offered by 93 of our respondents. Nutrition consultation is probably the most widely offered, with 70 depart-

* Only 14 of the narrative reports were analyzed in detail.

ments indicating sponsorship of this service, although only 40 employ their own nutritionist. Apparently, state health departments either provide this service directly to the local institutions, through the local health department, or help the local public health nurse assigned to institutions to give sound nutrition advice. Sanitarians and nurses may provide advice on food sanitation and accident prevention. A few departments specifically encourage rehabilitation measures. Another few have contributed significantly to the quality of care for children with handicapping conditions through the provision of administrative and clinical consultations using hospital consultation teams.[3]

Health Services to Individuals

Personal Health Services for People with Specific Diseases or Disabilities—For the most part, responding health departments indicated that they make available services for prevention, diagnosis, treatment, and rehabilitation in relation to children with any one of a long list of diseases or conditions. As might be anticipated treatment services are offered by somewhat fewer departments than offer preventive or diagnostic services. Rehabilitation services are still more limited. We have no indication of the conditions of eligibility for these personal health services.

What was not anticipated was the number of departments indicating that some personal service in each of the categories mentioned was provided for adults as well as for children. However, programs for children outnumber those for both children and adults, or for adults only except in the diagnostic categories of tuberculosis, syphilis, obesity, and alcoholism. It is important to point out that departments other than those providing general medical care do make personal health services available for specific diagnostic groups.

Eighty-five departments say that they conduct programs for simultaneous screening or detection of more than one chronic disease or disability. The respondents' interpretation of this question is interesting. A number of departments pointed out that their well baby and school health programs included "screening" for chronic disease and potentially handicapping defects. A medical care program called attention to its comprehensive admission physical examination as a multiple screening device. Many departments mentioned the reading of chest x-rays for cancer and heart disease as well as for tuberculosis. Group instruction in nutrition or for control of obesity is carried out by a relatively limited number of departments (62 and 43, respectively).

Most of the respondents (154) have instituted specific arrangements for referring health department patients to other community programs or resources for needed care not available through the department. A few mention the use of special referral forms with return slips to indicate that service was received by the referred patients. Some departments use a regular public health nursing follow-up procedure. Formal referral arrangements are most frequent with the visiting nurse agency, the local welfare department, Veterans Administration facilities, vocational rehabilitation agencies and the state health department.

Public Health Nursing Services—Most of the departments (over 90 per cent) indicate that their nurses on home visits observe not only the patient but other family members for signs of chronic disease offering advice and assistance to all family members concerning cancer, diabetes, obesity and other chronic conditions. Family members are referred for physical examinations or for available screening services. The home is observed for accident hazards during nursing visits by the staff members of 174 departments. Since most of the de-

partments offer a generalized public health nursing service perhaps this range of activity should have been expected. About 80 per cent of the departments indicate that the same degree of alertness to the possibilities of chronic disease exists in the clinic services provided by the public health nurses. Follow-up is provided for rheumatic fever patients and those who have had acute poliomyelitis, in order to help keep them under medical supervision by 134 and 156 departments, respectively. Only 74 departments offer such follow-up for diabetic patients.

In view of the increasing interest in home care and the shift in the case load of nursing services toward more patients with long-term illness or disability, it should be pointed out that two-fifths of our respondents (76 departments) provide bedside nursing care for the chronically ill.

Indirect Participation in Personal Health Services—Twenty-seven local health departments in the survey sample provide grants or other forms of financial assistance to community programs offering individual care. More than a third of the departments (74) provide such equipment as x-ray, materials for social hygiene, pediatric and prenatal clinics, general sick room supplies, prosthetic devices, and wheel chairs to other agencies. Seventy-one respondents make members of the health department staff available to assist in the direct service programs of other agencies.

Program Review

The survey question on program review called for a narrative answer. Of the 60 such answers analyzed,* only a few more than one-half, or 37 responses give any indication of any type of review of program or activities relating to chronic disease. Few respondents use the word "evaluation" although one department states that all its services are subject to continuous evaluation. No mention is made of method by this department, and its response goes on to state that there is no systematic review of chronic disease services.

Periodic reports by disease categories is the form of review must commonly mentioned. Annual review of all cases and suspects with an annual report based on monthly conferences and monthly reports is mentioned in relation to tuberculosis. Registry reviews for syphilis, cancer, and handicapping conditions of children may be carried out by the health officer and his nursing director. Periodic analysis is made of positive findings in blood sugar screening tests and in the reading of chest x-rays for heart disease, cancer, and other pathology. One department prepares semi-annual summaries of all cancer activities. A few departments mention the use of conferences with the public health nursing staff, or with the entire departmental staff, as devices for analyzing chronic disease activities. However, one department reported that: "The rough draft of this questionnaire was prepared at an executive staff meeting—the first time 'chronic illness' has ever been a topic for such interbureau discussion. We are considering appointing a committee to continue the studies initiated by this questionnaire."

Comments

The questionnaire used in this survey reflects the conviction that there is need for chronic disease services in a chronic disease program which, in turn, is part of the community health program. This implies further that the official local health agency has a part to play, but only within the over-all pattern of serv-

* Questions calling for narrative answers were analyzed for whether or not the respondents did or did not carry out activities directed to a particular goal in 60 of the 187 responses. Detailed study of 14 of these narrative responses was completed for this report.

ices provided by a number of community resources. The responses to the survey support the thesis that many chronic disease services have long been provided, and many more can be provided, with existing health department resources. This is not meant to deny the need for new kinds of resources—new disciplines, added facilities, new administrative and organizational forms—but to underline the fact that many of the requirements for the prevention and management of chronic disease and disability can be met with the tools, the professional people, and the facilities already familiar to the health officer.

One additional thesis underlying the approach of the questionnaire is that the future of sound health department practice in this field lies in the development of what the Subcommittee on Chronic Disease and Rehabilitation has called the "programmatic approach." Services should be "wide-spectrum health services" [4]—under the broad program headings of health promotion, disease prevention, treatment, and rehabilitation—rather than services developed by disease categories.

What have we found? To paraphrase one health officer's comment at the end of the questionnaire—as you see, we have a great many services, from the health department and from other agencies, but no chronic disease program. That, he remarked, is for the future. These numerous services are often made available within the framework of traditional health department organization and without specialized personnel. The absence of special administrative units for chronic disease services is impressive.

While it is generally true that more activities are conducted by those departments which consider chronic disease one of their major fields of responsibility, examples of almost every type of service covered in the survey questionnaire may be found in departments willing to state that chronic disease activities are not among their major responsibilities. Both groups of departments offered few examples of the development of some services. Staffing patterns, for example, do not differ widely. The failure to obtain current chronic disease morbidity data applies to both groups. Half of each group also fails to provide for methods of program review, an item of particular importance in newly developing areas of public health practice. The responses neither validate nor disprove the widely accepted idea that chronic disease services, are, for the most part, developing under disease titles. If this is the preferred method of development, under the powerful stimulus of categorical funds and a disease-oriented public, is it bad? Is there really a common thread which binds the chronic disease services together—but which does not tie them to services relating to "non-chronic" disease? Certainly, all the facts concerning the impact of chronic illness on our people justify an intensification of our efforts to reduce this burden. Is this current need for emphasis a sufficient justification for a chronic disease program?

If we can justify a program, how do we define it? What makes a program a program, rather than a collection of services? What shall we say is the purpose of a local chronic disease program? How does its purpose differ from that of a cancer control program, from that of a state chronic disease program? What are the objectives of the local program? How are they to be achieved? How do we measure how far we have come—and at what cost? ("Purpose is the reason why; objective that which is sought to be achieved . . . a definite, measurable aim of program action, capable of being reflected in standards of performance." [5])

None of the questions raised here are peculiar to the area of chronic disease,

but they are among the questions brought to mind and still unanswered by the survey. We have the feeling that answers to these questions, and many more, will be required before a broad programmatic concept can be applied more generally to developing chronic disease services.

NOTE: The materials on which the paper is based were collected in the course of a survey of chronic disease activities of local health departments undertaken in the summer and fall of 1955 by the Subcommittee on Chronic Disease and Rehabilitation of the Committee on Administrative Practice, American Public Health Association, under contract with the Chronic Disease Branch, Division of Special Health Services, Public Health Service. Responsibility for the analysis of these materials and for any opinions based on this analysis that may appear in this paper is, however, solely that of the authors, who participated in the survey as staff members of the Subcommittee on Chronic Disease and Rehabilitation. The authors wish to thank the subcommittee and the Public Health Service for granting them permission to use in this paper data developed from the survey.

REFERENCES

1. The Local Health Department—Services and Responsibilities. An Official Statement of the American Public Health Association. Adopted Nov. 1, 1950. A.J.P.H. 41:302–311 (Mar.), 1951.
2. Muller, J. N., and Bierman, Pearl. Cooperation Between Departments of Health and Welfare. Pub. Health Rep. 71:833–840 (Sept.), 1956.
3. Wallace, Helen M.; Losty, Margaret A.; Siffert, R. S.; Tobis, J. S.; and Lending, Miriam. Analysis of a Hospital Consultation Program. Ibid. 71:967–973 (Oct.), 1956.
4. Scheele, L. S. The Broadening Area of Possible Control. Proc. 1955 Ann. Conf., Surg. Gen., PHS with State and Territorial Health Officials, pp. 9–18. PHS Publication No. 464, Washington, D. C.: Gov. Ptg. Office, 1956.
5. Nathan, M. L. Some Steps in the Process of Program Planning. A.J.P.H. 46:68–71 (Jan.), 1956.

Dental Specialty Board Examination

The American Board of Dental Public Health will hold its next certifying examination on November 1–2, 1957, in Miami, Fla., for which applications must be submitted not later than July 1, 1957. Information and application forms may be obtained from the Secretary, Dr. Philip E. Blackerby, Jr., 250 Champion St., Battle Creek, Mich. The following officers for 1957 were recently elected:

President—Walter J. Pelton, D.D.S., M.S.P.H., chief, Dental Resources Division, Bureau of Medical Services, Public Health Service

Vice-President—John W. Knutson, D.D.S., D.P.H., chief dental officer, Public Health Service

Secretary-Treasurer: Philip E. Blackerby, Jr., D.D.S., M.S.P.H., director, Division of Dentistry, and associate general director, W. K. Kellogg Foundation, Battle Creek

Board Member—Chester Tossy, D.D.S., assistant director, Division of Public Health Dentistry, Michigan Department of Health (five-year term to succeed William A. Jordan)

American Journal of

PUBLIC HEALTH

and the Nation's Health

Official Monthly Publication of the American Public Health Association, Inc.

Volume 47 | March, 1957 | Number 3

The Midas Touch in So-Called "Useless" Knowledge

Someone once estimated that the "phase rule" developed by Willard Gibbs in the mid-nineteenth century was more responsible for the growth of modern industry than any single product of the human mind. This informed observer further stated that the dollar value of this one product of the genius of Gibbs exceeded the billions now so regularly noted in the annual reports of industry.

Yet this obscure professor at Yale was not carrying on a project, was without academic salary for years, had a handful of graduate students, and wrote briefly and for the most part unintelligibly to his associates. Today, we would describe him as engaged in "basic" inquiry—still too rare and too esoteric to entice major public interest and support.

In the field of public health, two highways for the future are essential. On the one, the most effective translation of known scientific data into current health department practice is the major objective. This highway has been well described recently by Hilleboe in these editorial pages in the February issue of this Journal. Its design and exploration need not be further labored here, beyond re-emphasizing the richness of this field still and forever to be tilled by the imaginative health official.

On the other highway, one must travel a longer but even more rewarding journey—whose terminus is the disclosure of new knowledge. Even that knowledge whose usefulness is not too clear and so often is even rated as useless.

This concern about the pursuit of the truth in scientific endeavor, of the irrelevant, of the obscure and even of the queer, has taken on increasing significance as more and more money has been released, in public and in private funds, for investigation in application and in development. We are falling behind in our emphasis on fundamental research upon which the long-range progress in medicine and in public health will undoubtedly hinge.

As in all fields, these basic inquiries will have their successes, not only in medical schools, universities and schools of public health, but in health departments, if these latter provide the climate for the imaginative worker not too closely restricted to the grindstone of daily administrative practice.

Money alone will not lift us to a high level of basic research, but its sinews are essential to a far greater degree than are now at hand. The real key, of course, lies in men, devoted to the search for the deep-seated secrets of man's physical and

mental behavior. Such men need no vast funds. They need untrammeled money, unrestricted by too specific limits and purposes.

The nature and subtleties of such support for basic study are beautifully expounded in the definitive two-volume work entitled "Medical Research: A Mid Century Survey" issued a year ago by the American Foundation. With the continuing pressure on legislative bodies for funds for the study of specific diseases and for circumscribed projects, it would be a millenium if statesmen, political and scientific, devoted some serious bed-time reading of this great text!

Preventing Home Accidents—The Progress Is Slow

Recent years have witnessed increased emphasis on the epidemiology of accidents in the home and on some practicable administrative and educational programs for their prevention. The Committee on Administrative Practice of the Association recognized some time ago the significance of these causes of morbidity and mortality by selecting as one of its major activities an inquiry into accident prevention through health departments.

The Kellogg Foundation has invested considerable sums in detailed studies and demonstrations within a series of similar departments. The Rochester (N.Y.) Health Bureau many months ago began a systematic attack on the same problem, with the intensive support of department nurses and staff. Original data are obtained from records of the seven local hospitals. These data are then canvassed for each accident by home visits by public health nurses in connection with their other and more familiar duties. More than half of these home accidents were found to be preventable, with the parents' ignorance or laxity or both in major responsibility. The Rochester study confirms many previous findings that the younger the child the more vulnerable he is to home hazards. Simple corrections of house designs and of maintenance of furnishings and equipment would reduce accidents to a very considerable degree.

Inquiries by the State Department of Health of Maryland and others disclose similar, and by now familiar, aspects of the home accident. The issue can no longer be met only by the cliché that some people are accident-prone! And so they are! But the two-year-old that swallows a can of cleaning fluid left too easily within its reach by a careless mother should not be so classified yet. The woman over 60 who falls down a basement stairway, unlit and without a handrail, could at least divide the responsibilities between accident-proneness and a careless house builder!

Children under five and men and women over the age of 65 account for some three-quarters of the fatal accidents in the home. In children this "disease" is rapidly becoming the leading cause of death!

Is the health officer giving this promising field of prevention the time and the effort it obviously deserves? Or is it still so pedestrian and familiar an area of disability and death as to be noncompetitive with more glamorous fields? If a child's burns could be materially reduced by the design of a more stable cup and saucer, as one health officer validly suggests, does this preventive measure place it outside the health officer's purview?

We are not making the strides we should in the prevention of home accidents.

A COMMITTEE REPORT

Report on American Sanitary Engineering Intersociety Board

Engineering and Sanitation Section

GEORGE O. PIERCE, M.S., F.A.P.H.A., and
MARK D. HOLLIS, C.E., F.A.P.H.A

On October 21, 1955, the American Sanitary Engineering Intersociety Board officially came into existence with the signing of the articles of incorporation and the adoption of the by-laws of the corporation. This unique event in American engineering professionalism culminated many years of study, discussion, and serious consideration of a number of proposals for certifying to the public those persons who are judged by their fellow engineers as qualified to be called sanitary engineers. Various groups of sanitary engineers and many of the leaders of the profession participated in and contributed to these discussions. The actual incorporation was preceded by many months of intensive work by members and especially the chairman of the Joint Committee for the Advancement of Sanitary Engineering.

During this past year the Board has established criteria for certification, made arrangements for holding the necessary examinations of applicants, and has already reviewed applications for certification, of which over 200 have been received since the application forms were made available last July. The first certificates will be granted and issued shortly after the first of 1957 to those applicants who have had a minimum of 15 years of professional practice and "have achieved a high standing in sanitary engineering" and who are qualified, therefore, for certification without examination. Written and oral examinations of other applicants will be held during the coming months and the names of all persons who become certified will be carried on a roster to be known as the American Academy of Sanitary Engineers.

Detailed information concerning the certification procedure and requirements are contained in the by-laws of the ASEIB, which, together with the Certificate of Incorporation and a list of the Board members, officers, and sponsoring organizations, are published in a bulletin of the ASEIB which may be obtained from the Office of the Secretary at 33 West 39th St., New York 18, N. Y. This office has been provided by the American Society of Civil Engineers which also loaned the new corporation the money needed to cover the costs of

Mr. Pierce is chief, Environmental Sanitation Branch, Pan American Sanitary Bureau, Regional Office for the Americas, World Health Organization, and Mr. Hollis is assistant surgeon general, chief engineer, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C.

Both Mr. Pierce and Mr. Hollis are members of the Board of Trustees of the American Sanitary Engineering Intersociety Board nominated by the American Public Health Association. Clarence I. Sterling, Jr., is the other Board member nominated by the Association.

This report was presented before the Engineering and Sanitation Section of the American Public Health Association at the Eighty-Fourth Annual Meeting in Atlantic City, N. J., November 13, 1956.

operation during the initial period of time while the application fees, examination fees, and annual certification renewal fees are building up a treasury. The interest and encouragement given to the Joint Committee by the officers of the Division of Sanitary Engineering and the Board of Direction of the American Society of Civil Engineers, as well as the material assistance just mentioned, has been a potent influence in bringing the work of the committee through many obstacles and periods of discouragement to its present state of fruition.

The basic requirements for certification are registration as a professional engineer, graduation from an accredited college of engineering, and at least eight years of sanitary engineering experience. The applicant must be of good moral character and of high ethical and professional standing. A special requirement is that the engineer have had at least four years of responsible charge of work in sanitary engineering. The Board has adopted the definition of the term "Sanitary Engineer" as prepared and approved by the Committee on Sanitary Engineering and the Environment of the National Academy-National Research Council. Copies of this definition have been printed by the Board for distribution to engineers who may be interested in certification. Education, experience, and the results of written and oral examinations will all be considered by the Board in determining the eligibility of the applicants for certification. Those with unusually high qualifications and at least 15 years of suitable experience may qualify without examination if they apply before July 1, 1957. The application must be accompanied by the fee of $10. An examination fee of $25 is required of all those whose applications are accepted, and must be paid at least 60 days before examination. Those who are certified will be listed in the American Academy of Sanitary Engineers. An annual registration fee of $5 will finance publication yearly of a membership roster.

A Specialty Committee of the Board examines the qualifications of the applicants, arranges for the examinations, and evaluates the results of the examinations and recommends to the Board those whom it feels are qualified to receive Certificates of Special Knowledge in one or more fields of Sanitary Engineering. Five such fields are recognized by the Board. These are: Water Supply and Waste Water Disposal, Public Health Engineering, Industrial Hygiene, Radiation Hygiene and Hazard Control, and Air Pollution Control.

The membership of the Board includes three representatives each of the five societies represented on the Joint Committee for the Advancement of Sanitary Engineering and three members at large. These five societies are the American Public Health Association, American Society of Civil Engineers, American Society for Engineering Education, American Water Works Association, and Federation of Sewage and Industrial Wastes Associations. Each society nominates and the Board elects the members of the Board. The American Institute of Chemical Engineers has accepted sponsorship of the Intersociety Board, but action has not been taken on its nominees to the Board. Any of the present nominating societies may withdraw as a participant in this ASEIB activity.

Certification is carried out for the purpose of furthering the objects and purposes of ASEIB which are, as stated in the articles of incorporation to be "to improve the practice, elevate the standards and advance the cause of sanitary engineering." The Board is incorporated in the State of Delaware as a society "not organized for pecuniary gain or profit" and is empowered, "except as specifically prohibited by law, to accept any gift, grant, endowment, de-

vise, or bequest made at any time to further its general purpose." No money or property has been received yet under this authority, but it could become an important provision and of great interest to the sanitary engineering profession.

The aims and objectives of the ASEIB, it will be noticed, are identical with those of the Joint Committee. The activities, however, are restricted to certification.

The foregoing is a factual outline of developments in the evolution of the Sanitary Engineering Intersociety Board. The Board is now a reality. Applications are being received and handled. The procedures and mechanics for certification represent a great deal of individual and group effort. In the near future actual Board certificates will be issued and the American Academy of Sanitary Engineers will have become a reality.

It is important, we believe, that all sanitary engineers recognize clearly that the meaning and stature of the Academy and membership in it will be exactly what we make it—no more and no less. The Intersociety Board and the Academy can become instruments of national prestige in which certification and membership will be sought as a goal by young sanitary engineers. Such prestige, however, will have to be earned, and those of us in the first wave of membership have a responsibility to initiate the policy of continuous study for improving and strengthening the certification mechanism in the Academy membership.

Considering the importance of this undertaking, its significance and great potential, we are sure all sanitary engineer members and Fellows of the American Public Health Association will wish to give it their full support and participation.

Clearing House on Public Health Salary Information and Personnel Needs

Medical Social Work Recruitment Aids

The Medical Social Work Section of the National Association of Social Workers is carrying on an intensive campaign, supported by grants from the National Foundation of Infantile Paralysis, to encourage young people to choose medical social work as a career.

Among three recent materials for this campaign is "A Long Way in a Short Time," the story of a year's journey toward rehabilitation of a diabetic patient with an amputated leg. The team play of numerous workers, with special emphasis on the activity of the medical social worker, and pictures of progress along the way are used to indicate to young people what medical social work means in work and in satisfactions.

"Toward Dignity and Independence" tells of the pregnant mother with polio and how the social worker on the team helped to adjust the family to a wheel chair mother. "Preparing for Medical Social Work" pictures scenes in the student's life — living arrangements, courses, types of field service, and much else.

The stories and pictures were built around actual patients, with permission, at various locations and institutions and an actual school. These are excellent examples of bringing to life the daily activities of a profession still too little known to the young person in school.

These pamphlets have been made available to young people in libraries, in vocational counseling offices, and elsewhere. They might be shared with those who are planning recruitment tools in this or other fields. National Association of Social Workers, Medical Social Work Section, One Park Ave., New York 16.

Internships in Official Agencies

By way of focusing on what is currently being done to break down "the reluctance of the best college-trained young people to go into the civil service," the National Civil Service League has published "Interneships in States, Cities, and Counties." It concludes that "provocative ideas are being tried out in interneship programs, but the surface has hardly been scratched when so few can be found in operation today. . . . It would seem that the reluctance of appropriating bodies to spend money on internships is what holds back most administrators. . . . Once tried, they have been welcomed by government and by participating universities. Their value has been proved. It would be doubled if interneships could be fitted into a complete, integrated training, development and staffing plan."

The internships reported on by 13 states of 44 that answered the query, four counties, and 15 cities are largely in the administrative area. Connecticut, Massachusetts, Minnesota, and Wyoming reported some in the health field. The programs are described in detail, together with such items as salaries, length of internship, recruitment, post-internship employment, among others. Public health residencies are not included in the discussion.

This study should be in the hands of every public health administrator, as well as other department heads. Meager

though the present activity is, there are, as the report indicates "provocative" ideas. National Civil Service League, 315 Fifth Ave., New York 16. Free.

Philadelphia's Pay Plan

The City of Philadelphia has adopted a pay plan for city employees as of January 1, 1957. The plan has 45 scheduled salary ranges, each with six increments. No full-time city employee starts at less than $2,220 annually; step six, for the highest category in which the public health services director is classified, is $19,810. In the medical and public health field many of the positions start at the second, third, or fourth step of the pay range.

The pay plan is available to personnel directors from the Personnel Department, City of Philadelphia, City Hall.

A Personnel Department Report

"A Year of Positive Personnel Administration" is the title of the 1955 annual report of the New York City Department of Personnel. It has a good deal of current interest because of the thorough-going management survey of the city completed within recent years. It reports that the accent in 1955 was "on the positive aspects of personnel management," that a comprehensive personnel program was begun, that programs of employee training were extended, and examination and investigation of candidates speeded up. For the year 1956–1957 a major goal is the extension of supervisory training programs to each city department requesting such training.

Department of Personnel, City of New York, 299 Broadway, New York 7.

College Training for Nurses

"The College Way to a Nursing Career" is a new booklet of the Committee on Careers. With both pictures and text it describes the possible college programs, professional nurse requirements, student life, cost of training, opportunities, particularly at the top; and such practical matters as salaries, working conditions and, interestingly enough, marriage prospects. Committee on Careers, National League for Nursing, 2 Park Ave., New York City. Single copies free. Others at 15 cents per copy with progressive reductions on quantity orders.

A Sanitarian Recruitment Leaflet

"If You Were a Sanitarian" is a recruitment folder prepared by the Washington State Association of Sanitarians. In brief text and pictures it answers five questions, What would you be doing? How would you do it? What qualifications do you need? Where would you work? and What salary would you receive?

The leaflet has been distributed to colleges, junior colleges, and high schools of the state, and to sanitarians in the state for distribution to interested persons. As written it could be used in any part of the country, since students are referred to their state university or college for information about academic training and the state or local health department for information on job opportunities.

The leaflet was prepared by the Educational Committee of the sanitarian group, whose chairman is J. F. O'Brien of the sanitary engineering staff of the Washington State Department of Health, 327 Smith Tower Bldg., Seattle 4; $5 per 100, reductions for larger orders.

50,000 New Social Workers Needed

The Public Affairs Committee and the Council on Social Work Education have cooperated to produce "Better Human Relations—the Challenge of Social

Work" by Lucy Freeman. It indicates that at least 50,000 new recruits to social work will be needed in the next decade. The various activities of social workers and the skills needed to perform are described in terms of the people who have been helped by social workers.

The two-fold purpose of the pamphlet is to make social work more fully understood by the general public and to make young people and their parents aware of the opportunities social work offers as a career. Public Affairs Pamphlets, 22 East 38th St., New York 16, 25 cents. Reductions for quantity orders.

Salaries of Sanitary Engineers

The Conference of Municipal Public Health Engineers, through a Committee on Salaries, has been studying the salaries of environmental sanitation personnel in local health departments. It has now distributed the first of five proposed sections of the committee's report. This section gives the general picture.

Of questionnaires sent to 1,492 local health departments with an estimated 7,500 environmental sanitation workers, replies were received from 371 departments with 3,251 professional sanitation positions. Hence, the sample represents about 43 per cent of such workers in local health departments. Salaries of engineers and sanitarians are analyzed by size of jurisdiction served, by geographic area, and by comparison with those of health officers.

Other sections due at a later date are, respectively, on salaries of engineers, sanitarians, and other sanitation personnel, with a final section on conclusions and recommendations. The present report is being published in the News Letter of the Conference of Municipal Public Health Engineers and is available in mimeograph form from Walter A. Lyon, Philadelphia Department of Public Health, City Hall Annex, Philadelphia 7.

Working Patterns of Women

"With the exception of physicians and dentists, the important professions and occupations in the health and medical care field are numerically dominated by women. This fact alone can be used to account for many of the personnel shortages in this field." Thus speaks Walter L. Johnson, Ph.D., in the Jan., 1957, issue of Public Health Reports in an article, "Personnel Shortages in the Health Field and Working Patterns of Women." He indicates as his purpose "to defend and emphasize the proposition that the facts identify a whole area of study which is relevant and significant to better understanding and control of personnel shortages in the health field." Exploring his thesis is recommended to public health and personnel administrators.

Credit Lines

The Journal cannot furnish copies of items mentioned in Credit Lines. Please send requests to the addresses given.

Blue Print for Accident Prevention

An "Accident Prevention Manual" has been prepared by the Contra Costa (Calif.) Health Department as a guide for operation of an accident prevention program by the staff. Particularly useful is a four-page chapter on the philosophy and the problem. Program activities in office and personnel safety are outlined, as well as the contributions of various departments to the safety program—nursing, sanitation, statistics, health education, and laboratory. The responsibilities of the accident program personnel are outlined and the state laws applicable to safety hazards listed. This manual should be useful to other health departments developing their accident prevention programs. The health officer is H. L. Blum, M.D., Contra Costa Health Department, P. O. Box 871, Martinez, Calif.

Education to Fight the Common Cold

Calhoun County, Mich., has developed a well organized educational program for fighting the common cold on a community-wide basis. "A Hot War Waged Against the Common Cold" tells the complete story of this operation. An interesting feature of the story is the methods used to win the cooperation of civic, professional, and educational groups before the plan was put into operation. The local press took up the crusade, published a series of news items on it all during the campaign, which continued for an entire winter season.

Hugh M. Robins, M.D., director, Calhoun County Health Department, was responsible for the leadership in undertaking this campaign. He and his staff joined forces with the schools:

1. To convince teachers, parents and children that the common cold is a serious menace and a hazard to the entire community, and
2. To teach what individuals can do to reduce the incidence, severity, and complications of respiratory disease.

The printed folder in which this story is told was prepared and is being widely distributed by the Educational Department, Kimberly-Clark Corporation, Neenah, Wis. Free.

Harder to Get TV and Radio Time

Although it is not generally available, Credit Lines is mentioning a recent issue of "Focus" by the National Tuberculosis Association (New York City) because it may spur ideas elsewhere. "Focus" was begun as a monthly memorandum to state and local tuberculosis associations, to board members, and to a variety of other persons, agencies or communication media when relevant. The purpose has been primarily to circulate current information about the tuberculosis program.

The October issue, however, was devoted to "Mass Media—TV and Radio," outlining the "complex state of change" which both network and local television and radio are currently undergoing. The current trends are described, what they mean by way of getting time on such media, and suggestions for dealing with the changed conditions. One conclusion is that it is harder to get free time on radio and television for getting the health message on the air and that consequently ever more ingenuity is needed.

This is a situation of which others as well as tuberculosis workers need to be aware.

A School Dental Health Resource

One of the recent Curriculum Bulletins of the Milwaukee Public Schools is devoted to "School Dental Health." This is described as a "resource unit to assist all teachers in the elementary, junior, and senior high schools in preplanning teaching units in dental health." This 68-page (mimeographed) bulletin was prepared cooperatively by the Milwaukee Public Schools and the Milwaukee Department of Health, Wis. No information is given as to the basis on which the Bulletin is available.

Posture for the Expectant Mother

The Maternity Center Association has published a set of six posters illustrated with drawings that emphasize posture, rest, and exercise for the expectant mother. How to climb steps, lift, etc., are pictured. They are available either in 12 x 15 posters for clinics, mothers' classes, etc., or in miniatures for distribution to the women themselves. Maternity Center Association, 48 East 92nd St., New York 28, N. Y.

Children in the Next Half Century

Perhaps as her swan song on leaving the Children's Bureau for the Harvard School of Public Health, Martha M. Eliot, M.D., is the author of "Strategy for Children" in Social Work for October, 1956, the quarterly of the National Association for Social Workers. Here she outlines some new bench marks against which the progress in children services in the second half of this century might be measured. "There are many reasons," she says, "why, for many years to come, it will be sound social policy to divert an increasing proportion of our national wealth into public and private human welfare undertakings, and again especially for children."

With the optimum development of all children—physical, mental, and spiritual—as a goal she suggests five basic tasks. They are building parental knowledge, strengthening family capacity to provide emotional and social security, preventing ill health and family breakdown, expanding the corps of workers for children, and an increase in the pace and amount of research in the life sciences particularly as they relate to the development of healthy personality and to effective ways of promoting it.

This is a provocative article that bears study by public health workers, especially those in maternal and child health services, but it must be read in Social Work since no reprints are available.

A Vaccine Education Program

The 1957 "Mothers March Against Polio" added something new to its house-to-house march for contributions. Each family received a vaccine reminder and record card suggesting the physician, the health officer, or the local polio society as the source of information on where vaccination could be provided. The card includes space for a record of vaccination for each member of the family and proper dates for the three necessary inoculations. The current recommendation of polio experts calls for polio vaccination of all persons up to 40 years of age.

Worth Acquiring

The Blue Cross Commission has developed two new 20-page "textlets," together with teacher guides, for classroom use in health education. "Man Against Disease," for upper elementary and junior high school use, helps the student learn about the facilities and services that help maintain good health

today. He will get a glimpse of the centuries of work and struggle that went into today's health knowledge and skills and will learn something of the important health heroes.

"Good Health—Key to Better Living" gives the high school student an awareness of his responsibility for his own health, both as an individual and as a member of his family and his community.

Each booklet was used in pilot experiments before being offered nationally. Public Service Department, Blue Cross Commission, 425 North Michigan, Chicago 11. Free in quantity.

"If Your Child Has Rheumatic Fever" is a new booklet of the American Heart Association planned especially for parents whose child has rheumatic fever. Its information, adapted from a Children's Bureau publication, reinforces the advice of the physician who may wish to distribute it to parents of children under treatment. Nurses and social workers who need to interpret the physician's instructions to parents will also find it useful.

This new publication, which discusses the care of young patients during the acute and convalescent phases of the disease and emphasizes protective measures to prevent return attacks, is the latest in a series of AHA publications for the public on various aspects of prevention and care of rheumatic fever and rheumatic heart disease.

"If Your Child Has Rheumatic Fever" and others in the series are available from state or local heart associations or the American Heart Association, 44 East 23rd St., New York 10, N. Y.

"Nutritional Contribution of Breakfast Cereals" is a coordinated teaching unit that includes a 16-page Teacher's Source Book with charts, illustrations, and photographs. Edited by Clara Mae Taylor, Ph.D., professor of nutrition, Teachers College, Columbia University, New York, N. Y., the unit includes a two-color 16″ x 22″ wall chart. Cereal Institute, Inc., 135 S. La Salle Street, Chicago 3; free.

Annual Report

"Goals for Rehabilitation," the 1956 annual report of the 35-year-old National Society for Crippled Children and Adults, details the Society's 1956 program. Three new rehabilitation centers were completed in 1956 and nine are under way or in the planning stage for 1957. Other facilities under construction are sheltered workshops, summer, and beach camps.

Among other activities of the Society and its state and local affiliates are scholarships to train doctors, therapists, teachers, social workers and others in work for the crippled. In 1956 the Society made the first of its research grants, including $16,000 to the American Academy for Cerebral Palsy Brain Registry.

An increase of 22 per cent in number of persons receiving care is reported for 1956—nearly 120,000 crippled children and more than 25,000 handicapped adults. Dean W. Roberts, M.D., heads a staff of some 2,000 professional, technical, and administrative workers in the Chicago, Ill., central office. There are 1,655 affiliates in the states and territories.

Books and Reports

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

The Medical Department Hospitalization and Evacuation Zone of Interior — By Clarence McKittrick Smith. Washington, D. C.: Gov. Ptg. Office, 1956. 503 pp. Price, $4.00.

This volume is outstanding in the history of military medicine. It is the first of a planned series concerning the Medical Department in World War II and describes the logistics of hospitalization and evacuation within the United States (Zone of Interior). Source material is primarily official unclassified records of the Department of the Army, with background supplied by officers who participated in the events described.

The contents are divided into four major sections with introductory notes by Surgeon General George E. Armstrong. Three sections are concerned with hospitalization during the Emergency Period (September 8, 1939–December 7, 1941), the Early Years (December 7, 1941–mid-1943), and the Later War Years (mid-1943–1946). The fourth part describes evacuation to and in the Zone of Interior.

The prewar period found the Medical Department little prepared for the hospitalization and evacuation problems of war. During this time the size of the Army increased from 210,000 to 1,686,403 officers and enlisted men. Immediate decisions and implementation of plans for hospital facilities, professional and enlisted personnel recruitment and training, supply and equipment procurement, and the development of procedures for the operation of a greatly expanded hospital system were necessitated. These actions did not come without difficulties, such as inherent organizational problems within the War Department, due to certain medical responsibilities not being directly under the surgeon general, higher level decisions to "compromise" differences with quartermaster general and chief of engineers, and shortages of construction material. Nevertheless, the surgeon general and his staff accomplished by December, 1941, an increase in total beds in station and general hospitals from approximately 16,000 to 74,000 and, by mid-1943, a total of approximately 220,000 beds.

As the war progressed the responsibilities and position of the surgeon general within the War Department became markedly improved, reflected in more direct supervision over field medical officers and hospitals and more conformity in individual hospital administrative patterns. The late war years and early postwar years brought further expansion of hospital beds and specialized medical, convalescent, and rehabilitation facilities.

Evacuation requirements brought improvement in ambulances, hospital trains, and ships. The use of air evacuation by helicopter and transport ranks as one of the outstanding accomplishments of World War II.

This volume is must reading for present and future military medical personnel. It is valuable as a resource book for hospital administrators, civil defense officials, and physicians.

J. Howard Beard

The Bubonic Plague and England: An Essay in the History of Preventive Medicine—By Charles F. Mullett. Lexington, Ky.: University of Kentucky Press, 1956. 401 pp. Price, $9.00.

In this solid study based on a wide reading of primary and secondary

sources, Mr. Mullett, a historian, has investigated the occurrence of bubonic plague in England and the effects of the disease on political, social, and economic life from the Middle Ages into the early 19th century. The story is focused mainly on the 16th, 17th, and 18th centuries. Under the Tudors and Stuarts, the plague visited England at frequent intervals, reaching a climax in the great epidemic of 1665. The author analyzes the various controversies concerning the nature of contagion, as well as the practical consequences derived from them. Thus he shows how quarantine was applied under various conditions and what action was taken by governmental bodies to prevent or control the plague. The interaction of the social, economic, and medical aspects of the plague is clearly demonstrated. As a meritorious contribution to the history of disease and of public health, this volume can be recommended to all health workers. GEORGE ROSEN

Toward Better Nursing Care of Patients with Long-Term Illness—Published by the National League for Nursing, Division of Nursing Education. New York: The League (2 Park Ave.), 1956. 102 pp. Price, $1.00.

This pamphlet describes the development of a unit in chronic illness and rehabilitation under the Demonstration Project on Methods of Integration in a School of Nursing, conducted under the auspices of the National League for Nursing and the Cornell University-New York Hospital School of Nursing.

It outlines the processes through which the curriculum for chronic illness and rehabilitation was revised. The report includes reactions of students who experienced the revised curriculum compared to the former ones, reactions of patients, objectives of faculty formulated by the curriculum subcommittee, objectives of students, as well as methods of students and supervisors in evaluating the students' progress and methods of evaluating the unit itself.

A helpful appendix amplifies some of the references in the text, with transcriptions of tape recordings of instructor-student conferences, a case history and examination questions.

The revised unit on chronic illness and rehabilitation focused more on developing attitudes than technical skills. Opportunity was provided for the student to observe the progress of patients over a period of eight weeks, to develop nursing care plans with some independence, and to work as a member of the health team. With instruction built around a nursing problem, students were helped to develop a point of view toward the chronically ill which contributed to high quality nursing care.

The enthusiastic attitude of students toward the care of patients with long-term illness, when taught under the revised curriculum, is in sharp contrast to the bored disinterest of those under the former plan. Concisely organized and interestingly presented, it is easy to follow the thinking of those who brought about the changes in this curriculum.

This report should be valuable to all those interested in the provision of good nursing service to patients with long-term illness. It has implications not only for nurse educators but also for nursing consultants and administrators.

HAZEL V. DUDLEY

Occupational Health Nursing—By Mary Louise Brown and John Wister Meigs. New York: Springer Publishing (44 East 23rd St.), 1956. 276 pp. Price, $4.50.

Nurses in occupational health will welcome this publication, the first on the subject since World War II.

The goal of the authors is to assist student and practicing nurses to learn more about occupational health nursing. No doubt their goal will be achieved. The content is well organized, concise,

clear, and simply written. The nurse's role in plant medical programs and community activities is well outlined. Current concepts of employee health maintenance programs are emphasized and extend to community life. The philosophy and purpose of business organizations are portrayed in contrast to hospital settings. Responsibilities and functions of the nurse as described are brief and objective.

It is hoped the function of "home visiting" as stated by the authors will elicit new ideas on the subject. This function by plant nurses may have been abused in the past when neither management nor the nurse understood the full responsibilities involved. If the plant nurse is qualified to make home visits it is a desirable professional activity aimed toward improved employee health and welfare and should strengthen relationships between employer and employee.

The new nurse in industry will find this book a helpful guide. For instructors in schools of nursing this is a ready reference for basic principles as outlined and accepted by professional organizations. She will need to supplement dynamic, inspiring, and human interest illustrations to challenge students in occupational health nursing.

The experienced nurse will enjoy a copy on her bookshelf as a quick source for significant data on industry and occupational health as it relates to nursing.

EMILY M. SMITH

Treatment of the Child in Emotional Conflict—By Hyman S. Lippman. New York: McGraw-Hill (330 West 42nd St.), 1956. 298 pp. Price, $6.00.

This book is a valuable one for those whose work with people requires a knowledge of what a community child guidance clinic does, how it operates, and especially the kinds of clinical problems it is prepared to serve. At this point and time it is one of the few books on the market that is useful to those who make judgments as to referral of certain patients and families to child guidance clinics. The book does not duplicate those already available, such as Fred Allen's, "Psychotherapy with Children," or books dealing with "play therapy."

Dr. Lippman is a lucid writer and he makes his subject understandable and interesting. One of the most important features of the book is the author's presentation of a practical and scientifically acceptable nosology of the clinical problems seen in a child guidance clinic. For example he clarifies the concept of "neurotic" (a household word these days) by discussing neurotic symptoms, neurotic character, and neurotic acting out. The author's discussion makes the concepts useful to nonpsychiatric workers, as well as those in the specialty of child psychiatry, each of whom will use them in different ways and for different purposes. The chapter on the "psychopath" should tend to offset the loose use of this word, so prevalent at the present time.

The therapeutic approach described is that used in the Amhurst H. Wilder Child Guidance Clinic in St. Paul. The readers obtain a working concept of the various professional team members in the clinic in diagnosis and treatment. Perhaps too much prominence in the writing is given to the role of the psychiatrist. Although family diagnosis and treatment is mentioned from time to time as being the aim of the clinic, the reviewer felt the writing almost wholly dealt with the interaction of the child and his own therapist. The parents and their problems in the clinical picture are rather superficially treated.

The discussion of clinical problems is up to date, and pertinent references to recent literature on controversial subjects are listed. Although the index is useful it is not very detailed. Case

material is skillfully and artfully used. One senses that Dr. Lippman is an excellent teacher.

Public health nurses, physicians in clinical practice, staffs of social agencies, and students preparing themselves for specialized roles in the humanities and the community should find this book a helpful one.

KENT A. ZIMMERMAN

The Training of Sanitary Engineers; Schools and Programmes in Europe and in the United States—By Milivoj Petrik. World Health Organization Monograph Series No. 32. New York: Columbia University Press (2960 Broadway), 1956. 151 pp. Price, $4.00.

Under the leadership of the late Dr. Norman Begg, the WHO Regional Office for Europe began to evidence a great interest in sanitary engineering in Europe as early as 1950. In that year the first of a series of seminars for European sanitary engineers was held in the Netherlands. Since that time there have been four other European seminars. In addition, the Regional Office in April, 1955, sponsored a symposium on the education and training of sanitary engineers in Europe. This symposium which was held in Oxford was attended by prominent experts on sanitary engineering in Europe. This monograph by Professor Milivoj Petrik of the University of Zagreb, Yugoslavia, is based on material he prepared for the symposium.

Professor Petrik made an extensive survey of European schools and programs and collected a large volume of material by means of personal visits, correspondence, and study of the available programs. His study covers 16 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal Spain, Switzerland, Turkey, United Kingdom, and Yugoslavia.

In addition, he reviewed sanitary engineering programs in a selected number of American universities. His survey covers 13 American engineering schools —the Massachusetts Institute of Technology and the engineering schools of the following universities: California, Cornell, Harvard, Illinois, Johns Hopkins, Michigan, Minnesota, New York, Purdue, Texas, Tulane, and Wisconsin. He also reviewed postgraduate training available to engineers in accredited schools of public health in the United States. He gives information on the schools of public health of the following universities: California, Columbia, Harvard, Johns Hopkins, Michigan, Minnesota, North Carolina, Pittsburgh, Tulane, and Yale. His review of programs in the United States was not based on personal visits but on a review of catalogue announcements, as well as information obtained by correspondence. Professor Petrik is quite well prepared to evaluate data obtained in this way, since some years ago he did graduate work in the United States at Harvard University and hence has had a firsthand experience with an American university. He states in his monograph that he appreciates that information which has been "gleaned from catalogues or bulletins of the respective universities and institutes, and a comparison of curricula on this basis can neither be very precise nor trustworthy, since the extent of contents, quality and level of a particular course are not evident. . . . However, since only well known schools have been chosen, the method used may be accepted, though with some reservations."

Professor Petrik has assembled in this monograph information not previously available in one publication. The monograph will be an invaluable reference to everyone interested in sanitary engineering education. It should be on the bookshelf of all agencies which are concerned with providing training grants for graduate work for sanitary engineers. It is

well written and can be recommended without reservations.

HERBERT M. BOSCH

The States and the Metropolitan Problem—By John C. Bollens. Chicago, Ill.: The Council of State Governments (1313 E. 60th St.) 1956. 153 pp. Price, $2.50 paper; $3.00 cloth.

The problems of multiple local health departments in a single metropolitan area are becoming greater and more serious as the trend toward increasing geographic concentration of population continues. These problems are further intensified with the absolute increase in population associated with a substantial increase in birth rate and decrease in death rate. More than half of the people of the United States now live in metropolitan areas, and this population trend seems to be growing here and in many other countries in direct ratio to the country's over-all development. The rather glib answer of city-county consolidation of health departments, although having advantages in many instances, is far from a panacea and also suffers from disadvantages which frequently outweigh the benefits.

This study of the problem of government in metropolitan areas is a clear, thought-provoking, factual summary of six major devices by which people in the United States and Canada have tried to alter the pattern of government to minimize problems of public health services, fire protection services, police protection services, etc. City-county consolidation is only one of these devices and the study director concludes that it is not one of the better ones. The other five are: annexation, city-county separation, federation, functional transfers and joint efforts and, finally, special metropolitan districts. Each of these is described, analyzed, and examples are cited. Definite recommendations are made concerning preponderant advantages and disadvantages of each. Although the latter three are favored in general, special circumstance may make some of the others the method of choice in certain localities.

The paramount public health importance of the pollution of water and air cannot be gainsaid. Sewage disposal, water supply, and air pollution are among the commonest jurisdictional problems in the multiple municipalities of the average metropolitan area. The free flow of water on and below ground and the freer flow of air above ground makes more of a mockery of geopolitical boundaries than almost any of the other factors involved in the close human cohabitation of metropolitan areas. For such reasons many persons considering the modification of the patterns of government to improve the health of the public in metropolitan areas will find this concise analysis of the major alternatives stimulating and very valuable.

EDWARD PRESS

Parasites and Parasitism — By Thomas W. M. Cameron. New York: Wiley (440 Fourth Avenue), 1956. 322 pp. Price, $6.75.

This volume discusses the fundamental problem of parasites and parasitism as encountered in the filterable viruses, bacteria, protozoa, helminths, arthropoda, mollusca, and vertebrata. There are also chapters on the host and its reactions to parasitism. The presentation is stimulating and there is a well balanced blending of the morphology, physiology, and the life cycles of the various parasites. The origin and development of parasitism among the various groups is developed.

Although the author states that no previous knowledge of parasitology is required, the lack of this background would seriously handicap the average reader of this book. This volume will be found to be extremely valuable by graduate students, professional parasi-

tologists, and zoologists. Although it would be of general interest to medical students, physicians, and veterinarians, it is not designed for them, as the clinical and therapeutic aspects of parasitic diseases are not included.

HAROLD W. BROWN

The Nature of Brucellosis—By Wesley W. Spink. Minneapolis, Minn.: University of Minnesota Press, 1956. 464 pp. Price, $8.00.

Summed up in this book are presently known facts and well supported conclusions and opinions about brucellosis. Into it have gone observations made throughout 20 years of study by the author, assisted during the final years by a competent team of clinical, epidemiological, and laboratory investigators. Interspersed are clear statements of problems still unsolved. The book is effective, readable, informative, challenging and therefore important.

The first chapter is a brief history of brucellosis. The causative organism is characterized in a second chapter, followed by a chapter each on the animal reservoirs of brucellosis and its dissemination to man. The final eight chapters cover epidemiological studies, pathogenesis of the disease in man and animals, the course of human brucellosis, its complications, laboratory diagnostic criteria and problems, therapy, prevention of the disease in man and animals and a brief but provocative inquiry "What of the future?" Four appendixes follow, one of which contains 244 case histories of interest especially to clinicians and epidemiologists. An additional service has been performed by the compilation of a bibliographical index of 906 items. The real meat and the real challenge of this book are to be found in the excellent chapters on pathogenesis, clinical course, complications, and therapy.

In the opinion of this reviewer, this book has a value beyond its undeniable reference utility to physicians, clinical pathologists, epidemiologists, and veterinarians. Research workers in diverse biological disciplines interested in host-parasite phenomena and the problem of pathogenesis will find in it much food for thought which, more likely than not, will suggest projects for this investigation.

EARLE K. BORMAN

Books Received

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed.

ACCEPTED DENTAL REMEDIES 1957. Chicago, Ill.: American Dental Association, 1957. 214 pp. Price, $2.00.

ALLERGIC DERMATOSES. Edited by Rudolf L. Baer. Philadelphia, Pa.: Lippincott, 1956. 110 pp. Price, $3.00.

BIOCHEMICAL INDIVIDUALITY. THE BASIS FOR THE GENETOTROPHIC CONCEPT. Roger J. Williams. New York: Wiley, 1956. 214 pp. Price, $5.75.

BOOK OF HEALTH. American Medical Association, Edited by Dr. W. W. Bauer. New York: Dell Books, 1957. 320 pp. Price, $.35 pocket edition.

DISCUSSION ON CHILD DEVELOPMENT. VOLS. I AND II. THE FIRST MEETING OF THE WORLD HEALTH ORGANIZATION STUDY GROUP ON THE PSYCHOBIOLOGICAL DEVELOPMENT OF THE CHILD, GENEVA, 1953. VOL. I. THE SECOND MEETING OF THE WORLD HEALTH ORGANIZATION STUDY GROUP ON THE PSYCHOBIOLOGICAL DEVELOPMENT OF THE CHILD, LONDON, 1954. Vol. II. New York: International Universities Press, 1957.

Vol. I, 240 pp. Vol. II, 270 pp. Price, $10.00 for the two volumes.

DISEASE CONTROL AND INTERNATIONAL TRAVEL. A REVIEW OF THE INTERNATIONAL SANITARY REGULATIONS. H. S. Gear and Z. Deutschman. New York: Columbia University, 1956. 74 pp. Price, $.70.

EDUCATORS GUIDE TO FREE TAPES, SCRIPTS, AND TRANSCRIPTIONS (3rd ed.). Compiled and Edited by Walter A. Wittich and Gertie Hanson Halsted. Randolph, Wis.: Educators Progress Service, 1957. Price, $5.75.

ENZYME ANTIGEN AND VIRUS. F. Macfarlane Burnet. New York: Cambridge University Press, 1957. 193 pp. Price, $3.50.

ILLUSTRATIVE ESTIMATES OF FEDERAL EXPENDITURES AND REVENUES, BY STATES. Selma Mushkin. Washington, D. C.: U. S. Department of Health, Education, and Welfare, PHS, Division of Public Health Methods, 1956.

AN INVENTORY OF SOCIAL AND ECONOMIC RESEARCH IN HEALTH (5th ed.). Compiled by Frederick R. Strunk. New York: Health Information Foundation, 1956. 254 pp. Free.

MEDICAL ASPECTS OF MOTOR VEHICLE ACCIDENT PREVENTION, A SYMPOSIUM ON. New York University-Bellevue Medical Center and the Center for Safety Education, New York University. Reprint New York State Journal of Medicine, Vol. 56, No. 24, Dec. 15, 1956. New York: New York University, Center for Safety Education, 1956. 32 pp. Price, $.50.

MENTAL HEALTH ADMINISTRATION. Jack R. Ewalt. Springfield, Ill.: Thomas, 1957. 168 pp. Price, $5.50.

MY MINDS AND I. A DEVELOPMENT OF SPIRITUAL PSYCHOLOGY. E. V. Crane. Boston, Mass.: Christopher Publishing House, 1957. 269 pp. Price, $4.00.

NATURAL RESISTANCE TO INFECTIONS. New York Academy of Sciences, Annals of the. Vol. 66, Art. 2. W. McDermott, et al. New York: The Academy, 1956. 176 pp. Price, $3.50.

NEW PERSPECTIVES FOR RESEARCH ON JUVENILE DELINQUENCY. Children's Bureau Publication Number 356. Helen L. Witmer and Ruth Kotinsky. Washington, D. C.: Gov. Ptg. Office, 1956. Price, $.30.

NEW PROBLEMS IN MEDICAL ETHICS. VOL. III. Dom Peter Flood. Westminster, Md.: Newman Press, 1957. 299 pp. Price, $4.50.

NOTES ON ATOMIC ENERGY FOR MEDICAL OFFICERS. The Royal Naval Medical School, Alverstoke, Hampshire, England. New York: Philosophical Library, 1956. 169 pp. Price, $4.75.

OCCUPATIONAL THERAPY — PRINCIPLES AND PRACTICE (2nd ed.). William Rush Dunton and Sidney Licht. Springfield, Ill.: Thomas. 1956. 373 pp.

PREGNANCY AND BIRTH. A BOOK FOR EXPECTANT PARENTS. Alan F. Guttmacher. New York: Viking Press, 1957. 335 pp. Price, $4.50.

PROBLEMS OF AGING. Robert L. Craig, Editor. New York: George Eliot, 1956. 240 pp. Price, $3.50.

SOCIAL WORK YEAR BOOK 1957 (13th issue). Russell H. Kurtz. New York: National Association of Social Workers, 1957. 752 pp. Price, $7.50.

STAPHYLOCOCCAL INFECTIONS. ANNALS OF THE NEW YORK ACADEMY OF SCIENCES. Vol. 65, Art. 3. David E. Rogers, et al. New York: The Academy, 1956. 190 pp. Price, $4.50.

STUDIES OF THE AGED AND AGING. SELECTED DOCUMENTS—VOL. II. HEALTH AND HEALTH SERVICES. Compiled by the Staff of the Committee on Labor and Public Welfare, United States Senate. Washington, D. C.: Gov. Ptg. Office, 1957. 232 pp.

TEEN-AGERS AND ALCOHOL: A HANDBOOK FOR THE EDUCATOR. Raymond G. McCarthy. New Haven, Conn.: Publications Division, Yale Center of Alcohol Studies, 1956. 188 pp. Price, $4.00.

WILLIAMS-WATERMAN FUND FOR THE COMBAT OF DIETARY DISEASES. A HISTORY OF THE PERIOD 1935 THROUGH 1955. Robert R. Williams. New York: Research Corporation, 1956. 120 pp.

WOMEN OF FORTY. M. E. Landau. New York: Philosophical Library, 1956. 49 pp. Price, $2.50.

A Selected Public Health Bibliography with Annotations

Preventable, Too—"Age 21 marks the peak in mortality from motor vehicle accidents. . . ." "The sharp rise in the rate for old people is due . . . to their inability as pedestrians to cope with current traffic conditions." We Americans elect to live so hazardously that we must like danger.

ANON. Rise in Motor Vehicle Accident Fatalities. Statist. Bull. Metrop. Life Insur. Co. 37, 11:1 (Nov.), 1956.

Take-Home Pay—Is it of interest to you to know what nurses have been paid during the last five years? Whether or not you are a nurse the upward trend in nursing salaries may perhaps be significant in matters of your own stipend. A graph indicates that nursing salaries are lower in nonofficial agencies than in local health units or boards of education.

ANON. Salaries of Public Health Nurses in Selected Public Health Nursing Services. Nursing Outlook 5, 1:35 (Jan.), 1957.

Anent Easy Payments—". . . American families are interested in a budgeting mechanism for almost all goods and services from toasters to personal health services. To encourage people to save for what they need and want, some form of periodic prepayment system is indicated for dental services. . . ." Only one in three have dental care as things are now.

ANDERSON, O. W. Family Dental Costs and Other Personal Health Services: A National Survey. J. Am. Dent. A. 54, 1:69 (Jan.), 1957.

Engineering or Guesswork—In Michigan air pollution control is a function of the Department of Health. Some of the difficulties the Division of Occupational Health and the cooperating industries have experienced in trying to reduce pollution are candidly described.

BLOOMFIELD, B. D. Air Pollution Control Installations. Am. Indust. Hyg. A. Quart. 17, 4:434 (Dec.), 1956.

Early British—This you must certainly hunt out if only to be delighted by the photographs of a (British) health staff of 1900 vintage; a MOH starting out on his rounds; a "minor ailments" clinic of 1908; and a "food sales" clinic counter. If you don't go on to read the whole story then you are without curiosity and are to be pitied!

CHAVE, S. P. W. Bringing History to Life. M. Officer 96, 26:389 (Dec. 28), 1956.

Private Relations — American women today tend to approach pregnancy and childbirth informed or misinformed, appraising and critical of proffered services, and more than a little confused. Their often expressed needs are usefully explored by one who has made a lifetime study of changing mores.

CORBIN, H. Meeting the Needs of Mothers and Babies. Am. J. Nursing 57, 1:54 (Jan.), 1957.

Stop, Look, and Listen—A committee appointed by the British Medical Council issued a report on the hazards of atomic radiation at about the same time as the (American) committees of the National Academy of Sciences issued its now famous report. The two findings on the effects upon the individual and the genetic consequences on his progeny are compared in this review. Apparently both take rather glum, but not entirely similar, views of the prospects.

GLASS, B. The Hazards of Atomic Radiation to Man. J. Hered. 47, 6:260 (Nov.–Dec.), 1956.

Job to Be Done—Baltimore's long struggle with the problem of lead poisoning in childhood points to one culprit—the old, delapidated homes in which high-lead-containing paints applied decades ago are now slowly flaking away, to be eaten by curious toddlers. The job is rehabilitation of substandard housing.

HARRISON, H. E. Childhood Lead Poisoning. New York State J. Med. 56, 24:3938 (Dec. 15), 1956.

One-in-Twenty Have It—New York State's experience in promoting a campaign for early case finding of breast cancer is recounted. By a questionnaire, the results of a self-examination program are measured.

HILLEBOE, H. E., et al. Detection of Breast Cancer. New York State J. Med. 56, 24:3919 (Dec. 15), 1956.

More Childhood Poisoning—A modern medium for the prevention of accidental poisoning in the home is the described "Poison Control Center," a focus for community-wide collaborative effort. The team called for in teamwork comprises about everyone in the health and welfare fields.

JACOBZINER, H., and RAYBIN, H. A New Approach to the Control of Chemical Poisoning. New York State J. Med. 57, 2:209 (Jan. 15), 1957.

News for You—More than half the 300,000 legally blind have a little sight. Recent developments in the hitherto neglected field—creating aids for the partially-sighted—have vastly improved the condition of these handicapped people. Is this something you should know more about?

LEBENSOHN, J. E. Optical Aids for Subnormal Vision. Sight-Saving Rev. 26, 4:201 (Winter), 1956.

Rheumatic Fever—The first of three papers of a symposium, "emphasizes the defects that exist in our understanding of the chain of events leading from an infection with hemolytic streptococci to the occurrence of rheumatic fever." The succeeding papers are revealing, too.

MCCARTY, M. Nature of Rheumatic Fever (and two related papers) Circulation 14, 6:1138 (Dec.), 1956.

Real Rehabilitation—This is the story of Disabilities, Inc., as told by the only able-bodied employee—the nurse. Handicapped workers enjoy Blue Cross-Blue Shield coverage and the greatest use to which hospital insurance is put, believe it or not, is said to be for maternity benefits.

PARENTI, M. Who's Disabled? Nursing Outlook 4, 12:688 (Dec.), 1956.

Voice of Experience—In this community demonstration of the possibilities for preventing childhood accidents it was assumed that before-and-after statistics would measure the campaign's effectiveness. It turned out that evaluation was not to be so simple a matter: reporting was sporadic and incomplete; hospital admitting practices changed. An advisory committee of people known to get things done helped a lot. Identification with the community interest was vital, as was medical participation.

RICE, R. G., et al. Accidental Injuries to Children. New England J. Med. 255, 26:1212 (Dec. 27), 1956.

Lest We Forget—An entire issue of school health's principle mouth-piece is given over to the tuberculin testing in the schools. Other than those whose chief interest is still tuberculosis are likely to be lulled by recent headlines into assuming that "wonder drugs" have made anything as old-hat as tuberculin testing decidedly de trop. This journal will quickly dispell such foggy assumptions.

SHEPARD, W. P. Another Fruitful Avenue of Tuberculosis Control (and five related papers). J. School Health 26, 10:300 (Dec.), 1956.

About Growing Pains and Freckles—Rheumatic heart disease

prevalence, among a random sample of Framingham residents, 30-59 years old, was 27 per 1,000. Histories of frequent sore throats and scarlet fever were more common among them than for other people. It appears that growing pains do not accurately reflect subclinical rheumatic fever and that rheumatic heart disease is not more common in persons with freckles.

STOKES, J., III, and DAWBER, T. R. Rheumatic Heart Disease in the Framingham Study. New England J. Med. 255, 26:1228 (Dec. 27), 1956.

Second Notice—If you failed to look up, or couldn't find, that scholarly address upon the influence of Edwin Chadwick on our native brand of public health—mentioned last summer in this earnest guide to helpful reading—then you have a reprieve. A reprint is published in a journal to be had for the asking, if you ask promptly.

WILLIAMS, H. The Influence of Edwin Chadwick on American Public Health. Baltimore Health News 33, 12:97 (Dec.), 1956.

A Chuckle a Day—This you should read because of the excellence of its presentation, but also because this joint paper may provide you with a few chuckles. In speaking of automation one of the authors comments: "Human birth cannot be simplified to the point at which a statistic is wheeled into the delivery room to give birth to a bouncing baby decimal point."

ZEEZER, D. M., and LEONE, L. P. Our Future Patients . . . And Their Nursing Needs. Am. J. Nursing 57, 1:50 (Jan.), 1957.

If additional information is desired regarding the articles listed in the Bibliography, please communicate directly with the publications in which they appeared; the addresses are furnished for your convenience.

Am. Indust. Hyg. A. Quart. (American Industrial Hygiene Association Quarterly), American Industrial Hygiene Association, 605 North Michigan Ave., Chicago 11, Ill.

Am. J. Nursing (American Journal of Nursing), 2 Park Ave., New York 16, N. Y.

Baltimore Health News, City Health Department, Baltimore 3, Md.

Circulation, American Heart Association, 381 Fourth Ave., New York 16, N. Y.

J. Am. Dent. A. (Journal of the American Dental Association), 222 E. Superior St., Chicago, Ill.

J. School Health (The Journal of School Health), American School Health Association, 3335 Main St., Buffalo 14, N. Y.

J. Hered. (Journal of Heredity). The American Genetic Association, 1507-M, N.W., Washington 5, D. C.

M. Officer (Medical Officer), Chronicle House, 72/78 Fleet St., London, E.C. 4, England.

New England J. Med. (New England Journal of Medicine), Massachusetts Medical Society, 8 The Fenway, Boston 15, Mass.

New York State J. Med. (New York State Journal of Medicine), 292 Madison Ave., New York 17, N. Y.

Nursing Outlook, American Journal of Nursing Company, 2 Park Ave., New York, N. Y.

Sight-Saving Rev. (Sight-Saving Review), National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y.

Statist. Bull. Metrop. Life Insur. Co. (Statistical Bulletin Metropolitan Life Insurance Company), One Madison Avenue, New York 10, N. Y.

Association News

APHA Recruitment Project Under Way

At a meeting of the Subcommittee on Recruitment of the Committee on Professional Education, APHA, held at the School of Public Health, University of North Carolina, Chapel Hill, January 24–25, a progress report was made of the first six months of the research project cooperatively undertaken by the School of Public Health and the American Public Health Association on recruitment.

R. E. Coker, Jr., M.D., medical director of the recruitment study, introduced Thomas G. Donnelly, the vital statistician, Kirk Back, Ph.D., social psychologist, and Bernard S. Phillips, Ph.D., the junior social psychologist, who are working on the study. So far the staff has been concerned with the review of work done elsewhere and laying the plans for pilot studies and the preliminary pretesting of a rough sample plan. It is expected that the next seven months will extend the pretesting and its analysis, the completion of the rosters, and the final samplings. Under way is the appointment of a general advisory committee to involve, beside the university and the American Public Health Association, the Public Health Service, the Association of American Medical Colleges, the American Board of Preventive Medicine, the State and Territorial Health Officers Association, the Council on Medical Education and Hospitals of the American Medical Association and the Association of Teachers of Preventive Medicine.

Some of the early problems relate to a definition of what should be considered public health; should it include industrial medicine, aviation medicine, research, hospital administration, the teachers in schools of public health, the Armed Forces, and auxiliary public health fields like vital statistics?

Members of the subcommittee under the chairmanship of Franklin B. Amos, M.D., of Albany, N. Y., included Mildred E. Beisel, R.N., William C. Gibson, M.P.H., Richard H. Mattox, E. G. McGavran, M.D., and John H. Venable, M.D. Staff present included Reginald M. Atwater, M.D., executive secretary, and Edith M. Boyd, associate secretary of the Committee on Professional Education.

Revision of Standard Methods for Dairy Products

Luther A. Black, Ph.D., chairman of the APHA Subcommittee on Standard Methods for the Examination of Dairy Products, has announced the forthcoming preparation of the 11th Edition of "Standard Methods for the Examination of Dairy Products," a revision of the 1953 edition. The committee hopes to complete a first draft of the manuscript by the summer of 1957 and a final draft a year later. Constructive suggestions will be welcome and may be sent to any member of the nine reference committees, the chairmen and members of which are as follows:

Milk Sampling and Analysis—A. H. Robertson, Ph.D., A. C. Fay, Ph.D., and George H. Steele

Cultural Methods, Coliforms and Psychrophiles—Marvin L. Speck, Ph.D., Jacques Archambault, D.Sc., J. Lloyd Henderson, Ph.D., and G. T. Knowles, Jr.

Microscopic and Reduction Methods—Cyril K. Johns, Ph.D., Neil T. Gray, and Marie Mulhern

Detection of Pathogens—C. C. Croft, Sc.D.,

I. H. Borts, M.D., Ralph V. Hussong, Ph.D., and R. A. Packer, D.V.M., Ph.D.

Butter, Cheese, and Cultured Milks—Ralph P. Tittsler, Ph.D., F. E. Nelson, Ph.D., and George W. Shadwick, Sc.D.

Frozen Desserts—Leon Buchbinder, Ph.D., M. T. Bartram, Ph.D., and Edward J. Tjarks

Sanitization of Equipment, Air, and Water Supplies—David Levowitz, Ph.D., M. S. Campbell, Burdet Heinamann, and Paul W. Purdom

Sediment Tests—Curtis H. Joiner, C. A. Chiggoile, E. H. Parfitt, Ph.D., and John C. Flake, Ph.D.

Chemical Methods—Norman E. Yongue, Blaine L. Glendening, Ph.D., and J. L. Hileman

Dr. Black is chief, Milk Sanitation, Robert A. Taft Sanitary Engineering Center, Cincinnati.

Three New Publications on the Way

The way was cleared at the Annual Meeting for three new Association publications. "Laboratory Methods for the Microbiological Examination of Foods" was recommended for publication by the Coordinating Committee on Laboratory Methods and authorized for publication by the Committee on Research and Standards. This volume was prepared by a subcommittee whose chairman was Harry E. Goresline, Ph.D., of the Food and Nutrition Section.

"Basic Principles of Healthful Rural Housing" was also approved for publication by the Committee on Research and Standards. Professor C.-E. A. Winslow and M. Allen Pond were co-chairmen of the Subcommittee on the Hygiene of Housing.

A ninth revision of "Recommended Practice for the Design, Equipment and Operation of Swimming Pools and Other Public Bathing Places," prepared jointly by a committee of the Conference of State Sanitary Engineers and the Engineering and Sanitation Section, was approved for publication by the Governing Council as an Association publication. The Conference had approved its publication earlier.

APHA membership application blank on page XXXIII

News of Affiliated Societies and Branches

New York City Plans Ambitious Program

The Public Health Association of New York City will be taking up the question "How Are We Doing in Public Health?" by holding discussion groups during the spring.

There will be three groups meeting at various health centers in Manhattan, one in the Bronx, one in Queens, and another in Brooklyn. As far as practicable, the groups will relate their discussions to the neighborhood in which each group meets. Each group, in which several public health specialties will be represented, will meet six times. They will report on their general conclusions at the Association's annual meeting later in the spring.

This ambitious and novel undertaking has been the result of interest expressed by members in the question originally raised as the theme of APHA's 84th Annual Meeting in Atlantic City last November.

Information on dates and meeting places can be had from the Secretary, Joseph Kadish, Ed.D., 625 Madison Avenue, New York 22.

APHA AFFILIATED SOCIETIES AND BRANCHES

SOCIETY AND SECRETARY

ARIZONA PUBLIC HEALTH ASSOCIATION, Bertha I. Parkhurst, P. O. Box 905, Casa Grande
ARKANSAS PUBLIC HEALTH ASSOCIATION, Mrs. Ruby Holland, State Board of Health, Little Rock
CALIFORNIA, NORTHERN, PUBLIC HEALTH ASSOCIATION, Constance Cavender, Alameda Co. Health Dept., 15000 Foothill Blvd., San Leandro
CALIFORNIA, SOUTHERN, PUBLIC HEALTH ASSOCIATION, Byron O. Mork, M.D., University of California at Los Angeles, Los Angeles
COLORADO PUBLIC HEALTH ASSOCIATION, Margaret D. Lewis, 659 Cherokee St., Denver
CONNECTICUT PUBLIC HEALTH ASSOCIATION, Mrs. Claire Reinhardt, 310 Cedar St., New Haven
CUBAN PUBLIC HEALTH SOCIETY, Dr. Raphael Calvo Fonseca, San Rafael 1170, Havana
FLORIDA PUBLIC HEALTH ASSOCIATION, Nathan J. Schneider, Ph.D., P. O. Box 210, Jacksonville
GEORGIA PUBLIC HEALTH ASSOCIATION, J. F. Hackney, M.D., 224 Central Ave., S.W., Atlanta
IDAHO PUBLIC HEALTH ASSOCIATION, Mrs. D. W. McDougal, P. O. Box 563, Boise
ILLINOIS PUBLIC HEALTH ASSOCIATION, William B. Hixon, Evanston Health Dept., Evanston
INDIANA PUBLIC HEALTH ASSOCIATION, Hester Beth Bland, 1330 W. Michigan St., Indianapolis
IOWA PUBLIC HEALTH ASSOCIATION, Mary L. Wombacher, State Dept. of Health, Des Moines
KANSAS PUBLIC HEALTH ASSOCIATION, Evelyn Ford, State Board of Health, State Capitol, Topeka
LOUISIANA PUBLIC HEALTH ASSOCIATION, Mrs. Velma Brusse, Dept. of Health, New Orleans
MASSACHUSETTS PUBLIC HEALTH ASSOCIATION, Muriel Bliss Wilbur, 695 Huntington Ave., Boston
MICHIGAN PUBLIC HEALTH ASSOCIATION, Maurice J. Mayer, 405 Hollister Bldg., Lansing
MINNESOTA PUBLIC HEALTH CONFERENCE, D. S. Fleming, M.D., State Dept. of Health, University Campus, Minneapolis
MISSISSIPPI PUBLIC HEALTH ASSOCIATION, H. E. Boone, P. O. Box 1700, Jackson
MISSOURI PUBLIC HEALTH ASSOCIATION, Mrs. Nadia Craver, 5th Fl., State Office Bldg., Jefferson City
MONTANA PUBLIC HEALTH ASSOCIATION, Emma Wright, Box 811, Harve
NEBRASKA PUBLIC HEALTH ASSOCIATION, Matilda McIntire, M.D., Omaha-Douglas County Health Dept., Omaha
NEW MEXICO PUBLIC HEALTH ASSOCIATION, Robert Howell, 305 Terrace Ave., N. E., Albuquerque
NEW YORK CITY, PUBLIC HEALTH ASSOCIATION OF, Joseph Kadish, 164 W. 174th St.
NEW YORK STATE PUBLIC HEALTH ASSOCIATION, Mary C. Egan, New York State Department of Health, Albany, N. Y.
NORTH CAROLINA PUBLIC HEALTH ASSOCIATION, Mrs. Betty E. Briggs, State Board of Health, Raleigh
NORTH DAKOTA PUBLIC HEALTH ASSOCIATION, Mrs. Cora Shelstad, Court House, Finley
OHIO PUBLIC HEALTH ASSOCIATION, Virginia Jones, Ohio Dept. of Health, Dayton
OREGON PUBLIC HEALTH ASSOCIATION, Barbara Kahn, State Board of Health, Portland
OKLAHOMA PUBLIC HEALTH ASSOCIATION, Marjorie Butler, 3400 North Eastern, Oklahoma City
PENNSYLVANIA PUBLIC HEALTH ASSOCIATION, Robert H. Conn, 303 N. Second St., Harrisburg
PUERTO RICO PUBLIC HEALTH ASSOCIATION, Conchita Carrasquillo, Apartado 211, San Juan
SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION, Mrs. Carrie B. Du Priest, State Board of Health, Columbia
SOUTH DAKOTA PUBLIC HEALTH ASSOCIATION, Louis E. Remily, State Dept. of Health, Pierre
TENNESSEE PUBLIC HEALTH ASSOCIATION, C. B. Tucker, M.D., State Dept. of Health, 420 Sixth Ave., N., Nashville
TEXAS PUBLIC HEALTH ASSOCIATION, H. E. Drumwright, City Health Dept., Dallas
UTAH PUBLIC HEALTH ASSOCIATION, Mrs. Mildred Engar, Salt Lake City Board of Health, 115 So. State, Salt Lake City
VIRGINIA PUBLIC HEALTH ASSOCIATION, Nancy E. Lutz, 113 S. Third St., Richmond
WASHINGTON STATE PUBLIC HEALTH ASSOCIATION, Kathleen Burwell, R.N., State Dept. of Health, Smith Tower, Seattle
WEST VIRGINIA PUBLIC HEALTH ASSOCIATION, Harry M. Huff, State Dept. of Health, Charleston
WISCONSIN ASSOCIATION FOR PUBLIC HEALTH, Paul Wels, 1 W. Wilson St., Madison
SOUTHERN BRANCH, A.P.H.A., Joseph M. Bistowish, M.D., P. O. Box 1117, Tallahassee, Fla.
WESTERN BRANCH, A.P.H.A., Mrs. L. Amy Darter, State Dept. of Health, 2151 Berkeley Way, Berkeley, Calif.

Employment Service

The following pages present information for those seeking public health personnel and for those seeking positions in public health. Other information concerning vacancies and personnel available is on file in the Association office. Anyone wishing to have the benefit of this additional information can obtain it by writing to the Vocational Counseling and Placement Service of the Association.

Advertising space in these pages is available at special rates for the use of employers or individuals. The charges are $5 for the first 50 words or fraction thereof and $1 for each additional 10 words or fraction thereof. There is no charge to members or Fellows of the Association who desire to utilize the **Positions Wanted** portion of these pages. **Closing date** for receipt of advertisements is the first of the month preceding the desired month of publication.

POSITIONS AVAILABLE

Assistant Professor of Preventive Medicine—Full-time position teaching, research, and some administration. Apply, stating qualifications and salary expected, to Dr. J. J. Day, Professor of Preventive Medicine, University of Ottawa, Ottawa, Ontario, Canada.

Deputy Director of Health—as assistant to health director responsible for medical services in a municipality of approximately 190,000 population in a suburban area of 325,000. Department employs four full-time physicians, one full-time public health dentist, several part-time physicians and dentists to man clinics. Health department adjacent to city hospital. Position under civil service. Requirements: Graduate training in public health and practice of medicine and surgery. Salary range $9,100–$10,764.

Medical Social Work Adviser—Open to female citizens of the United States who possess the minimum qualifications. Salary range $4,680–$5,512.

Medical Technologist I—Open to citizens of the United States who possess the minimum qualifications. Salary range $3,432–$3,900.

Anesthetist—Open to citizens of the United States who possess the minimum qualifications. Salary range $4,056–$4,680.

Dietitian I—Open to female citizens of the United States who possess the minimum qualifications. Salary range $4,004–$4,628.

Assistant Superintendent of Hospitals and Institutions—Open to male citizens of the United States who possess the minimum qualifications. Salary range $5,720–$6,760.

Public Health Nurse—Open to female citizens of the United States who possess the minimum qualifications. Salary range $3,692–$4,316.

Write to Personnel Director, Municipal Bldg., Hartford, Conn.

Public Health Physician—for director of city-county health department in a progressive community of 65,000 population with high medical and hospital standards and having a full-time health department for thirty-five years and offering an excellent opportunity for continued program development. Health department staff includes public health nurses, dentist, sanitarians, health educator. Excellent personnel policies; good retirement plan. Entrance salary depends on qualifications. Area provides fine family environment with excellent school, cultural, and recreational facilities. Inquire, President, Adams County Board of Health, Quincy, Ill.

Medical Director—to carry on a state-wide occupational health program. Must be eligible for Kentucky licensure and have industrial hygiene experience. Salary $11,000 per annum. Benefits include Social Security coverage and state retirement. Write Merit System Supervisor, Kentucky State Department of Health, 620 S. Third St., Louisville, Ky.

Physician—to serve as director of communicable and chronic disease. Entering salary $9,540 per annum, with increase after six months of service. Formal public health training not required. Opportunity to attend school of public health after one year of service. Merit system, sick leave, annual vacation. Opportunity for work and teaching in medical school. Apply Director, Louisville and Jefferson County Health Department, 240 E. Madison St., Louisville, Ky.

School Health Physician—to direct nationally known demonstration program. Merit system and all fringe benefits. Salary open to qualified person. Write directly to Dr. W. Ross Cameron, P. O. Box 769, Hagerstown, Md.

Director—of county-wide health department in southeastern Michigan; population 78,000. Two local colleges with university and school of public health within 42 miles; staff of 13 with capable supervising nurse. Previous experience desirable, but not mandatory. Starting salary $11,500; can assume position anytime before April first. Must have M.D. from an American school and Michigan license. Contact: Chairman of Health Committee, Lenawee County Health Department, 113 W. Front St., Adrian, Mich.

Openings for **Public Health Physician**—in New Mexico. M.P.H. preferred. Salary range $750–$1,000 a month. Also, openings

for a **Director of Mental Health** and a **Director of School Health.** For information and application blanks write to Mrs. Marian Mann, Merit System Supervisor, Box 939, Santa Fe, N. M.

Pediatrician—To develop and direct a pediatrics program in a state health department. Provide consultant services to concerned department division chiefs and local health departments. Salary range $820–$980 per month. Requires physician with specialized training and experience. Eligible for Ohio license. Write Director, Ohio Department of Health, Columbus 15, Ohio.

Medical Health Officer—for district office offering consultant services in several disciplines. Responsible for the administration of the district office, coordination of the various programs, and medical consultation to local health units. Salary range $860–$1,020 per month. Local public health experience required. Eligible for Ohio license. Write Director, Ohio Department of Health, Columbus 15, Ohio.

Maternal and Child Health Director—Board certification in pediatrics. Administrative experience in public health preferred. $950–$1,150 plus travel expenses. Starting salary open. Write to Mr. A. T. Johnson, Personnel Director, Oregon State Board of Health, P. O. Box 231, Portland 7, Ore.

Public Health and Sanitation Staff Man—for national trade association representing a large and growing industry. Will be responsible for administration of broad industry public health program, organizing education program, and organizing regional meetings. Public speaking and some legislative work. Ability to organize and promote meetings and programs and to meet and work with many people is essential. Degree in public health or sanitary engineering preferred. Freedom to travel is necessary. Headquarters in Chicago. Salary open. Please write **Box C-33,** Employment Service, APHA, giving background, experience, age, and salary requirements.

Public Health Physician—for director of Butler County Health Department, Butler, Pa. (population 103,000). Permanently established department which has just received overwhelming vote of confidence of three and one-half to one in county-wide referendum. Well qualified staff includes a public health engineer, public health nurses, public health educator, and sanitarians. Three-year-old department with excellent opportunity for program development. Opportunity for association with the Graduate School of Public Health, University of Pittsburgh, for qualified man. Excellent personnel policies, unsurpassed retirement plan, fine educational, cultural, and recreational facilities. Starting salary $12,500–$14,500, depending on qualifications. Address inquiries to Edward C. Lutton, M.D., Chairman, Butler County Board of Health, 426 N. Main St., Butler, Pa.

Tuberculosis positions available, Virginia. **Sanatorium Physician B**—One each in three state sanatoria. Salary range $9,600–$11,472. Housing on grounds at reduced rates; staple foods at cost; Social Security; liberal state retirement, vacation, and sick leave privileges. Locations: Piedmont Sanatorium (380 beds)—60 miles from Richmond; Catawba Sanatorium (340 beds)—20 miles from Roanoke; Blue Ridge Sanatorium (382 beds)—two miles from Charlottesville. Each of these sanatoria recently has been modernized, with new buildings and equipment; access to major chest surgery; integral part of State Health Department sanatorium system; responsible for supervising and/or conducting regional chest clinics in neighboring area. Qualifications: Completion of one-year rotating internship in approved hospital; license, or eligible for license, to practice in state of Virginia, plus two years' experience in approved tuberculosis sanatorium, or two years in clinic or office practice under the supervision of a competent chest specialist. Two years of general practice may be substituted for one year of sanatorium or nonsanatorium specialized chest disease experience. Write: Dr. Mack I. Shanholtz, Commissioner, Virginia State Department of Health, Richmond 19, Va.

Tuberculosis positions available, Virginia. **Tuberculosis Control Physician B**—Division of Tuberculosis Control, State Health Department, Richmond, Va. Salary range $10,032–$12,000. Social Security; liberal state retirement, vacation, and sick leave privileges. Responsibilities: Supervision and/or conducting of regional chest clinics in cooperation with state sanatoria; interpretation of limited number of survey and clinic x-ray films each week; participation in various phases of state tuberculosis control program, upon consultative basis, including community x-ray surveys, etc. Qualifications: Medical license, or eligible for license, to practice in state of Virginia; completion of one-year rotating internship in approved hospital; five or more years' experience in clinical tuberculosis, at least four of these preferably should have been served in approved sanatoria, one year in a senior grade. One or more years of satisfactory experience in clinical tuberculosis and other pulmonary disease, or in tuberculosis control activity may be substituted for a portion of the sanatorium experience. Write: Dr. Mack I. Shanholtz, Commissioner, Virginia State Department of Health, Richmond 19, Va.

Physicians—West Virginia communities need public health oriented practicing general physicians. Broad and challenging program, excellent facilities, group practice, and hospital affiliation. Initial $12,000 net income (guaranteed); may be greater if location and experience warrant. Write Placement Service,

Hygeia Facilities Foundation, Inc., Box 1023, Charleston, W. Va.

Social and Preventive Medicine—Professor required to organize and head department. Excellent opportunity to collaborate in public health development of Saskatchewan. Records of universal hospitalization plan provide valuable research material. This medical school is committed to the study of medical care problems of Saskatchewan. Address: Dean of Medicine, University of Saskatchewan, Saskatoon, Canada.

Deputy Director of Public Health—Position available immediately. M.D. licensed to practice in Virginia. Staff of 47 serves progressive urban area adjacent to Washington, D. C. Generalized public health program. Initial salary $8,850 per year. Write, giving qualifications, to Director of Public Health, Alexandria, Va.

Minnesota Department of Health. State district generalized **Public Health Nursing Consultant**—Master's degree and experience as a supervisor desirable. Challenging position in a developing program. Liberal inservice education opportunities. State Civil Service. Apply to Alberta B. Wilson, Chief, Section of Public Health Nursing, Minnesota Department of Health, University Campus, Minneapolis 14, Minn.

Qualified Public Health Nurse—Must be eligible for California certificate. Salary $376–$458; travel allowance for use of private car. Write to San Benito County Health Department, Health Center Bldg., Hollister, Calif.

Qualified Public Health Nurses—for the Baltimore County Health Department. Suburban, industrialized, and rural areas. Population 354,200. Eight miles from Baltimore. Generalized program, including school health program. For use of personal car, seven cents per mile. Cars to be furnished in July, 1957. Sick leave and vacation after six months; five-day week; retirement plan; 13 paid holidays. **Senior Public Health Nurse** beginning salary, $3,399; **Junior Public Health Nurse,** $3,099. Write to Dr. William H. F. Warthen, Health Officer, Baltimore County Health Department, Towson 4, Md.

Public Health Nursing Positions—Available in combination health department and visiting nurse service. Public health nursing preparation required. Generalized service. Agency in a university community. Beginning salary $3,996, yearly increments. Social Security. Please write: Miss Patricia Walsh, Nursing Director, Washtenaw County Health Dept., County Bldg., Ann Arbor, Mich.

Public Health Nursing Positions—Available in health department with the city of Flint, a rapidly growing city of 180,000 population. Beginning, intermediate, and administrative positions are available. Five-day, 40-hour week, with liberal retirement, vacation, and sick leave policies. Car furnished. Beginning salary rates: $3,952, $4,329, or $4,654, depending on experience and qualifications. Automatic increases and longevity rates for length of service. Apply Flint Civil Service Commission, City Hall, Flint, Mich.

Public Health Nurse IV (Cardiovascular Disease Consultant Nurse)—with state board of health for expanded program development. Completion of approved public health course and four years' experience, including supervisory, administrative, educational, or advisory capacity. Salary range $5,040–$6,060. Travel allowance. Vacation, sick leave, retirement plan. Write Henry Kjentvet, Personnel Officer, Wisconsin State Board of Health, Madison, Wis.

Public Health Engineers — Vacancies **Public Health Engineer II** (registration required) in water pollution control and in hospital construction and sanitation programs. Salary $5,616–$6,828 per year. Also, **Public Health Engineer I,** $4,272–$5,196 per year, in water pollution control program. Appointment may be made above minimum depending on qualifications. Fringe benefits. Upward salary revisions pending. Write: Minnesota Health Department, University of Minnesota Campus, Minneapolis 14, Minn.

Sanitary Engineers—to work in Ohio on state public health program. Previous Ohio residence not required. **Sanitary Engineers, Grade III:** Graduation from accredited engineering college, preferably six years' experience, professional engineer registration from Ohio, or reciprocal state required. Salary range $600–$720. **Sanitary Engineer, Grade II:** Graduation from accredited engineering college, four years' engineering experience, professional engineer registration from Ohio or reciprocal state required. Salary range $525–$630. **Engineer-in-Training:** Graduation from accredited engineering college, including having certificate of professional engineer-in-training. Salary ranges $360–$440, $400–$480, $440–$525. Starting salary depends upon experience. Address application to Personnel Officer, Ohio Department of Health, Columbus 15, Ohio.

Sanitary Engineers—Classes II, III, and IV—Total of four vacancies in Utah State Health Department. Salary ranges: $440–$500, $575–$725, $670–$825, respectively. Requirements are B.S. and two years' experience, M.S. and three years' experience, M.S. and five years' experience, respectively. Write for information and application blanks to Lynn M. Thatcher, Chief, Bureau of Sanitation, Utah State Department of Health, Salt Lake City, Utah.

City and county position available. **Occupational Health Service Officer**—Public

health master's degree from accredited school of public health, with emphasis in occupational or industrial hygiene, plus two years in planning, developing, directing program in these fields. Apply: Career Service Authority, Room 178, City and County Bldg., Denver, Colo.

Senior Industrial Hygiene Chemist (Male or Female)—with state bureau of industrial hygiene in Hartford. To conduct plant surveys for hazardous exposures; determine atmospheric concentration of vapors, etc.; laboratory analysis of air samples. Merit system, 35-hour week, full complement of liberal personnel policies. Reply to Glendon A. Scoboria, Personnel Director, State Office Bldg., Hartford, Conn.

Sanitarians and Assistant Sanitarians (Male)—for several immediate openings in San Diego County Public Health Department. Requirements: **Sanitarian** ($397–$438 monthly), California registered or eligible for registration, preferably under 56, maximum 62 years of age; **Assistant Sanitarian** ($343–$378), limited to college graduates with science major under 36 years of age. Full details from County Civil Service, 403 Civic Center, San Diego, Calif.

Sanitarian—for generalized sanitation program in central Illinois county health department. Good retirement program plus liberal vacation and travel allowances. Beginning salary depends upon experience and qualifications. Apply Director, McLean County Health Department, 318 E. Locust, Bloomington, Ill.

Supervisor of Public Health Sanitation—Annual salary $6,604–$7,332. College degree with specialization in public health or public health engineering required. Some experience desirable. Vacation, sick leave, pension plan plus other fringe benefits. Apply Personnel Department, City Hall, 30 Gerald Ave., Highland Park 3, Mich.

Sanitarian II, III, and IV—$300–$466—Urban or rural communities. Experience determines rating and salary. John M. Posegate, Merit System Council, 349 State Office Bldg., Phoenix, Ariz.

Sanitarians and Public Health Nurses—Openings for qualified applicants. Excellent benefits, climate and working conditions. Write Clark County Health Department, P. O. Box 392, Las Vegas, Nev.

Public Health Nurses ($315 to $435) and **Graduate Nurses** ($255 to $370)—for generalized public health nursing in New Mexico Department of Public Health. Opportunities for advancement, retirement plan, and other fringe benefits. Write: Merit System Supervisor, Box 939, Santa Fe, N. M.

A leading national voluntary health association has openings in various parts of the country in many categories—**Field Workers, Health Educators, Chapter Executives.** Master's degree in health education or related fields desirable but not essential. Some experience in public health, community organization or administration of voluntary health agency required. Positions and salaries commensurate with background and prevailing local conditions. We want candidates who are interested in long-range career planning. Please send résumé to **Box C-31,** Employment Service, APHA.

Administrator of Research Program—for voluntary health agency in New York City. Ability to handle details of grant and fellowship awards and interpretation of technical reports for lay consumption. State age, education, degrees, experience if any, and salary requirement. **Box C-32,** Employment Service, APHA.

City and county position available. **Public Health Education Director**—Public health education master's degree with five years' responsible full-time experience in public health and administration of such program. Salary range $500–$628. Oral examination, travel expense paid. Apply Career Service Authority, Room 178, City-County Bldg., Denver, Colo.

Health Education Specialist (School Health Consultant)—Plan and develop statewide school health program; provide consultation and advisory service to school and public health personnel; participate in in-service training of professional groups and assist school administrators with teacher training; coordinate department program with other state and voluntary agencies. One year graduate study public health; three years' experience in education, public relations or public health; teaching experience. Salary $5,640–$6,660. Travel allowance; vacation, sick leave, social security, retirement. Dr. Amy L. Hunter, State Board of Health, Madison, Wis.

Health Educator—Develop health education program in multicounty region in and around Seattle, Wash.; also work on state-wide programs. Requirements: M.P.H., woman between 25–40, car. Eight cents per mile and travel allowance, social security, medical coverage. Salary open. Victor Schoch, Executive Director, Washington State Heart Association, 3121 Arcade Bldg., Seattle 1, Wash.

Dental Hygienist—To work in community dental health program. Must be graduate of accredited school. Salary $300–$440, depending on experience. State Board of Health, Helena, Mont.

Nutritionist—Regional position in northwest Florida. Applicant should have master's

degree in nutrition or public health or an approved dietetic internship, plus two years' experience in public health or related fields. Beginning salary $385. Travel allowance additional. Write Nutrition Division, Florida State Board of Health, Box 210, Jacksonville, Fla.

Social Work Supervisor II (Medical Social Consultant)—with state board of health for expanded cardiovascular and chronic disease program. Master's degree in social work and four years of professional experience in a social work program, at least one of which shall have been with a governmental agency such as a welfare or health department. Salary range $5,640–$6,660. Travel allowance, vacation, sick leave, retirement plan. Write Henry A. Kjentvet, Personnel Officer, Wisconsin State Board of Health, Madison, Wis.

Clinical Social Worker — Psychiatric Youth Services, Montgomery County Health Department, Rockville, Md. Christine W. Kehne, M.D., Director. Immediate opening for clinical social worker as member of clinic psychiatric team, dynamically oriented, that places special emphasis on developing a preventive program. It has found acceptance in this suburban Washington, D. C., community which is known for its capacity to explore methods and plan constructively for its needs. Duties include intensive casework with parents and children; shared responsibility with other clinical social worker for intake; participation in diagnostic, consultative services; and mental health education. Requirements: Master's degree, psychiatric sequence desirable, with two or three years' experience, preferably in a child guidance clinic or children's agency; or if not, at least one year supervisory and/or consultative experience. Salary $4,975 to $5,749 per year. Merit system employment.

Health Educator—for San Diego's large progressive City-County Public Health Department. Entrance salary is $483 plus mileage allowance. Master's degree with public health education major and one year experience required. Duties are strictly educational with departmental staff, community agencies, and citizen groups. Qualified health information specialists handle audiovisual, press, and related mass media. Write San Diego County Civil Service, 403 Civic Center, San Diego 1, Calif.

International Vacancies

Public Health Sanitarians—There are several positions open in Latin America and the Caribbean area for public health sanitarians in rural public health and malaria/Aedes aegypti mosquito eradication programs. Essential qualifications are formal public health training and some experience in the above-mentioned fields. Spanish is desirable in nearly all positions and essential in some. Salaries range from $3,600 to $4,800 per annum, plus income tax reimbursement and liberal overseas and family allowances. For further details contact Personnel Office, PASB/WHO, 1501 New Hampshire Ave., N.W., Washington 6, D. C.

POSITIONS WANTED

Medical Bacteriologist—Ph.D., very good background, 15 years responsible research, teaching, diagnostic bacteriology and administrative experience in colleges, universities, and hospitals; 10 years' TB research, seven years director of research. Desire responsible position in teaching and/or research, preferably in medical school, or as bacteriologist-in-charge of research in some area of medical bacteriology, preferably TB. Write **Box L-52,** Employment Service, APHA.

Sanitary Engineer—M.S.; 15 years' experience in research, public health engineering, and air pollution; past eight years have been on high governmental administrative level; age 38, married, family. Write **Box E-35,** Employment Service, APHA.

Director of Medical Education—Experienced medical educator, researcher, author, board-certified internist (FACP) seeks hospital staff which is eager to develop top-flight postgraduate medical educational program oriented in terms of preventive medicine and public health. Write **Box PH-69,** Employment Service, APHA.

M.D., M.P.H.—Early fifties, plans Army retirement in summer. Desire position in local or state health department, hospital administrator, or in industry. Foreign assignment acceptable. Thirteen years industrial and general practice, five years hospital commander, over two years public health in occupied territory and other command, staff and post surgeon experience. Write **Box PH-70,** Employment Service, APHA.

Public Health Educator—B.S., M.S.P.H., health education. Two years director of health education for official agency large midwestern city; three years director of health education for suburban county health department; one year junior high teaching. Experienced in community organization. Desire position with health and welfare council, director of voluntary agency, school health coordinator, or other responsible position. Complete résumé available. **Box HE-83,** Employment Service, APHA.

Commercial Advertisements

All communications on the following commercial advertisements should be sent to Burneice Larson, Medical Bureau, Suite 605, 900 North Michigan Avenue, Chicago 11, Ill.

OPPORTUNITIES AVAILABLE

WANTED: (a) Public health physician to direct city health department, population 100,000, resort area, Midwest; minimum $12,000. (b) Epidemiologist; preventive medicine staff, foreign operations, leading industrial company; $14,000, plus $4,000 family maintenance; federal tax free. (c) Public health physician to serve as director, student health department, coeducational public state college; 1,500 students; minimum $800. (d) Student health physician; 4,000 students; California. (e) Assistant director, student health department; 8,000 students; South; $9,000; month's paid vacation. (f) Health educator; master's (public health), five years' experience required; division of industrial hygiene, important organization; $6,550–$7,980, in four annual increases. (g) Health educator, county health department; fastest growing southern area; excellent opportunity; $6,700. (h) Public health engineer; county health department; attractive location; South; $5,500–$6,700. (i) Health educators; Chicago area; $5,000–$6,000. (j) Program director; important health organization; college graduate in one of following fields: civic, administration or political sciences, social work, public health; $8,500–$9,000; East. (k) Sanitarian; degree in sanitary sciences, public health or engineering, 3 years' experience required; foreign operations, major industrial company; $10,000–$12,000. (l) Health inspector experienced meat and dairy products inspection; foreign; $700. (m) Public health nurses for faculty appointment; collegiate school, nursing; planning, direction of students in field work; campus near resort area; mountain state; $4,000–$5,000. (n) Consultant, state health department; promote program; direct area nurses; $5,500, expenses; South. (o) Associate professor, public health nursing; state university; $5,000–$6,000; South. (p) Senior public health nurses; Alaska.

OPPORTUNITIES WANTED

WANTED—Opportunities for public health physicians, nurses, health educators, engineers, laboratory personnel. Candidates in all parts of the country, available for administrative, academic and staff appointments. Negotiations strictly confidential.

News from the Field

WHO News

Travel and Disease Control

A special number (Sept.–Oct., 1956) of the Chronicle of WHO, entitled Disease Control and International Travel, reviews the Current International Sanitary Regulations. Here is a history of quarantine, the changing picture in the present century, an analysis of present regulations, and a look to the future.

The final paragraph of the look into the future indicates some of the by-products of the more than a century of international action beginning with the first international sanitary conference of 1851, which was 17 years in the making.

"International quarantine is a subject close to the origins and evolution of all international health cooperation. It has a century of progress behind it, including remarkable changes during the last two decades. It has even more significance in that it has helped, in no small way, to teach governments the value and practicality of international discussion and negotiation in dealing with any subject. Its successes have helped to extend knowledge, understanding, and better living; and a worthy place in the world history of nations and of medicine should be accorded it."

Chronicle of the World Health Organization, Columbia University Press, 2960 Broadway, New York 27, 70¢.

Dr. Wegman PASB Secretary General

Myron E. Wegman, M.D., M.P.H., has been appointed secretary-general of the Pan American Sanitary Bureau as announced by its director, Fred L. Soper, M.D. In this position as the Bureau's chief planning officer, he is responsible for coordinating the program planning of PASB in the light of the health needs of the members. Dr. Wegman since 1952 has been in close association with the governments and public health administrations of the Americas through his position as chief of PASB's Division of Education and Training, working with medical and public health schools and other educational institutions. He has recently conducted seminars in preventive medicine for Latin American medical schools and has made a comprehensive survey of medical education throughout the continent.

Before joining PASB's staff, Dr. Wegman was head of the Department of Pediatrics, Louisiana State University and pediatrician-in-chief of its pediatric service at Charity Hospital, New Orleans. Earlier he was successively a faculty member at the medical schools of Yale University, Johns Hopkins University, the School of Tropical Medicine in Puerto Rico, Cornell, and Columbia Universities. He has been a staff member of both the Maryland State and New York City Health Departments.

Dr. Wegman is chairman of the Committee on Latin American Affairs, American Academy of Pediatrics, and of the Committee on Constitution and By-Laws, American Public Health Association.

Public Health in the Fiscal 1958 United States Budget

President Eisenhower in his budget message to Congress, presented on January 16, proposed expenditures for the promotion of health during the fiscal year 1958 at a level of 607 million dol-

lars, which is 106 million dollars more than in the current year, an increase of more than one-fifth over 1957. "The budget recommendations for the National Institutes of Health for the fiscal year 1958 provide for more research, while keeping in proper balance support of individual projects, training of additional technicians, and new laboratories and other facilities. . . . An increase of 38 million dollars in expenditures is estimated, primarily for the new grants to assist in the construction of medical research facilities and to provide the non-Federal institutions receiving grants with more equitable payments for the indirect costs of these programs."

Expenditures for federal hospital construction (Hill-Burton Bill) are estimated at 100 million dollars, representing an increase of 17 million dollars, or one-fifth, over the 1957 estimate, including provisions for nursing homes, rehabilitation facilities, and chronic disease hospitals. The budget also includes 62 million dollars in 1958 for the recently started program for grants to communities to stimulate construction of waste treatment facilities where federal aid is appropriate.

To meet other health needs, this budget includes expenditures for community health services to the aged and those with chronic diseases, for research in combating air and water pollution, for accident prevention, and for health services to children and Indians. Grants for poliomyelitis vaccine will no longer be needed. Enforcement of the food and drug laws will be strengthened.

"To help meet the critical need for more medical research scientists and other health personnel, the recently enacted legislation for construction grants for medical and dental research facilities should be amended to include teaching facilities. New obligational authority of 15 million dollars is recommended for this purpose. First year expenditures are estimated at 3 million dollars."

Pittsburgh Cancer Training Program

With support from the National Cancer Institute, the Pittsburgh Graduate School of Public Health is undertaking a program of advanced study and field training for students interested in cancer and other chronic diseases. The two-year program, providing basic training in public health methods and opportunity to share in community studies relating to chronic diseases and evaluation of control programs, will accept physicians, statisticians, laboratory research workers, nurses, social scientists, engineers, and others with suitable interests and professional backgrounds.

The Cancer Institute is supporting the program for a five-year period; the school matches the grant funds. Fellowships covering tuition and stipend for 24 months are provided for those without a master of public health degree; for a shorter period for those with the degree.

Further information from: Dean, Graduate School of Public Health, University of Pittsburgh, Pittsburgh 13, Pa.

Demonstrations in Urban Renewal

Federal assistance to local and state health departments, as well as to other public agencies, is available for the conduct of demonstration programs in activities involved in urban renewal. "These grants are to assist in developing, testing, and reporting methods and techniques and carrying out demonstrations and other activities for the prevention of slums and urban blight." Federal grants may provide up to two-thirds of the cost of the project. The one-third local contribution may be in the form of authorized services.

Two publications, "Guide to Demonstration Grants" and "A Report on Urban Renewal Demonstrations," will be of assistance to anyone contemplating a request for a grant under the federal

statute. The latter describes seven projects in as many states completed by the end of February, 1957, and 11 projects in seven states and Puerto Rico to be completed at various times up to November, 1958.

Copies of the reports may be obtained from: Housing and Home Finance Agency, Urban Renewal Administration, Washington 25, D. C.

Committee for the Aging Expands

The National Committee for the Aging of the National Social Welfare Assembly has received a half million dollar grant from the Ford Foundation for the general support of its activities. The fund will be used over a period of several years chiefly to establish and maintain an information and consultation service to organizations and community groups providing services to older persons. A central library of books and pamphlets on aging will be established, with provision for loan folders for groups and exhibits for conferences. A national roster of speakers and consultants will be assembled.

The National Committee is made up of some 200 persons broadly representing interests concerned with meeting the needs of the aged. One-fourth are from business and industry. Geneva Mathiason is the secretary of the committee, 346 E. 45th St., New York City.

A Foundation Library Center

The Foundation Library Center was incorporated in 1956 as an educational institution under New York State Laws, "to collect, organize, and make available to the public reports and information about foundations." An initial grant has been made by the Carnegie Corporation, charging the Center with the tasks of gathering comprehensive information about foundations, stimulating adequate reporting, and making freely available its collections of foundation reports. Among the materials it has, including information on more than 500 foundations, are the related books, reports, and files on foundations that the Russell Sage Foundation has been collecting since 1915.

The Center is located at 588 Fifth Ave., New York 36; its director is F. Emerson Andrews; chairman of its trustees is James E. Perkins, M.D., managing director of the National Tuberculosis Association.

Radiation Protection Regulations

The Pennsylvania State Advisory Health Board recently adopted "Radiation Protection Regulation 433" to insure maximum safety to persons exposed to radiation energy through radiation machines, radioactive materials and other sources whether the exposure is in the normal conduct of business in the utilization of such materials or exposure through the disposal of radioactive wastes. Copies of the regulation have been distributed to physicians, osteopaths, dentists, veterinarians, chiropractors, chiropodists, isotope users, and other industrial concerns in the state. There has also been developed a Registration of Sources of Radiation form to be sent to the State Health Department by users of radioactive materials.

Use of shoe fitting fluoroscopes was outlawed by the Advisory Board because such devices frequently expose the user to radiation but are not necessary for the welfare of the public. Copies of the regulation and registration form can be obtained from Karl M. Mason, Director, Bureau of Environmental Health, Pennsylvania State Department of Health, Harrisburg.

AMA in Polio Vaccination Drive

The American Medical Association is promoting an all-out polio vaccination

program in order to encourage everyone, particularly those under 40, to be vaccinated. This was agreed upon at a recent meeting in Washington, D. C., called by the trustees and the representatives of state and territorial medical associations. Here it was recommended that the medical profession go "all out" in promoting the use of the vaccine. It was recognized that principle responsibility rests with state and local medical societies, which should be urged to make every effort to begin the campaign as soon as possible so that at least the first inoculations could be administered by March 1.

Those attending the Washington meeting included Julian Price, M.D., a member of the AMA Board of Trustees, L. E. Burney, Surgeon General of the Public Health Service, and representatives of the American Academy of Pediatrics, the American Academy of General Practice, and the Association of State and Territorial Health Officers. Dr. Price has been appointed chairman of a special AMA Committee on Poliomyelitis to promote the inoculation campaign on which Surgeon General Burney also serves.

Summer School of Alcohol Studies

The 15th Annual Session of the Summer School of Alcohol Studies, Yale University, will be held July 1–July 27, 1957. For this interdisciplinary study of problems of alcohol and alcoholism in society, enrollment is limited to 200 students. The course, planned for physicians, caseworkers, psychologists, clergy, educators, probation, parole and correctional officers, personnel directors and supervisors in industry, community leaders, will include workshops and lectures and seminars under the direction of specialists drawn from the social sciences, medicine and psychiatry, religion, education, and public health.

Further information about admission and costs from: Registrar, Yale Summer School of Alcohol Studies, 52 Hillhouse Avenue, New Haven, Conn.

Annual Exchange of VD Information

The eighth Annual Symposium of the Public Health Service on "Recent Advances in the Study of Venereal Diseases" will be held in the auditorium of the Department of Health, Education, and Welfare, Washington, D. C., on April 24–25, 1957. Sessions are open to physicians and workers in allied professions. Topics to be discussed will cover many aspects of venereal disease control including basic and clinical research, serology, epidemiology, treatment, program operation, and professional education.

Physicians and Ionizing Radiation

The Scientific Committee on the Effects of Atomic Radiation of the United Nations General Assembly calls upon the medical profession to assist in minimizing dangers inherent in the use of x-rays and other types of ionizing radiation. The committee calls attention to the fact that any irradiation of human tissue causes a certain amount of damage. Somatic effects are reversible and with time will be corrected; germinal effects, on the other hand, are not reversible. Once damage has been done, it remains done. This becomes particularly important in the possible development of genetic changes.

Because the amount of radiation received for medical purposes in certain countries is now the main source of artificial radiation and probably equal to the amount of radiation received from natural sources, the committee calls upon the medical profession to minimize this hazard. The standards prepared by the International Commission on Radiological Protection are meant for a very small group of people who by the nature

of their professional activities must be exposed to an unusual amount of radiation. It warns "that medical irradiations of any form should be restricted to those which are of value and importance, either in investigation or in treatment, so that the irradiation of the population may be minimized without any impairment of the efficient medical use of radiation."

The medical profession is asked to assist the committee in two ways: one, to advise the committee through appropriate governmental channels how medical irradiation can be reduced without minimizing the value that can be obtained in the proper efficient use of radiation, particularly what reduction in radiation can be obtained through improvements in the design of instruments and in better training of personnel, by a wise choice between radiography and fluoroscopy, and by better administrative technics to avoid unnecessary repetition of identical examinations. The second is for an estimate of the total radiation received by the germinal tissue of the population before and during the child-bearing age. The committee hopes to use this information in developing means for decreasing the total medical irradiation while preserving and increasing the true value of the medical uses of radiation.

A New State Health Bulletin

"Washington's Health" beginning in August, 1956, is perhaps the newest State Health Department bulletin. Planned as a bimonthly, the first two issues are of eight and 12 pages respectively. The masthead carries out the Evergreen State motif. Its purpose as expressed in the first issues from the director's desk is to "stand as spokesman-in-print for the department. As such its duty will be to reflect the thinking, the planning, and the accomplishments of public health workers."

Bernard Ducove, M.D., M.P.H., is the state's director of health, Donald E. Luke is the editor.

West Virginia's Cancer Registry

The West Virginia State Department of Health, with the joint sponsorship of the State Cancer Society, has established a central cancer registry. On January 1, 1957, in cooperation with 11 hospitals of the state at the outset, the registry will systematically follow up all cancer patients and keep them under continuing medical supervision.

PERSONALS

LEWIS ANDREWS,* executive director, Kansas Commission on Alcoholism, has resigned to become public health adviser, Kansas City Regional Office, Public Health Service.

MARY M. ATCHISON, M.D.,† deputy health officer, has succeeded JOHN S. WHEELER, M.D., as health officer of New Hampshire.

VINTON W. BACON,† executive officer, California State Water Pollution Control Board, has resigned to work in the field of air and water pollution control with the pulp and paper industry in Washington and Oregon. Headquarters are in Tacoma. He has been succeeded by PAUL R. BONDERSON, former executive officer, Central Coastal Regional Water Pollution Control Board, San Luis Obispo, Calif.

HUSTON J. BANTON, M.D., M.P.H.,† former Massachusetts regional director, American Red Cross Blood Program, is now health officer of the Alexander-Pulaski Bicounty Board of Health in Illinois.

LEONA BAUMGARTNER, M.D.,* commissioner of health for New York City, has received an honorary fellowship in the British Royal Society of Health in recognition of her noteworthy work in connection with the promotion of health.

MADISON B. BROWN, M.D.,† executive vice-president and medical director, Hahnemann Medical College and Hospital, Philadelphia, has been appointed director of administrative services, American Hospital Association, Chicago.

BETTY W. BOND, M.P.H., Ph.D.,* former health education consultant, Minnesota Department of Health, is now chief of health

* Fellow.
† Member.

education services, Minneapolis Division of Public Health.

HARRY W. BRUCE, JR., D.D.S., M.P.H.,* formerly in the Regional Office, Atlanta, is now regional dental consultant, Region III Office, Public Health Service, Charlottesville, Va.

SARAH A. BUTTS, medical social work consultant, National Society for the Prevention of Blindness, has resigned to accept a position with the Bureau of Public Assistance, U. S. Department of Health, Education and Welfare, Washington, D. C.

PETER A. BREYSSE, public health engineer, Montana State Health Department, has resigned to accept an Atomic Energy Commission fellowship for graduate study in industrial hygiene at the University of Pittsburgh School of Public Health.

EDGAR C. CUMINGS, Ph.D., is now educational consultant, American Social Hygiene Association.

JEAN A. CURRAN, M.D.,† former associate executive dean, State University of New York, is now adviser to the Charities Trust of William H. Bingham, Boston, retaining his connection with the State University of New York as professor of the history of medicine and consultant.

LAWRENCE G. DERTHICK, former superintendent of schools, Chattanooga, Tenn., has succeeded SAMUEL M. BROWNELL as United States commissioner of education.

DONALD G. DICKSON, M.D.,* former Clinton County health officer, is health commissioner of the newly organized Rockland County Health Department, New City, N. Y.

DOROTHY B. FEREBEE, M.D., formerly acting director, has been appointed director of the health service, Howard University, and assistant professor of public health in the College of Medicine.

JOHN A. FERRELL, M.D.,* executive secretary, North Carolina Medical Care Commission, retired at the end of January, 1957.

MINNIE FINK, R.N.,† former health educator, Receiving Hospital, Detroit, has been appointed health education consultant, Montana State Health Department, serving in several counties with headquarters at Polson.

PAUL J. FLORY, Ph.D., professor of chemistry, Cornell University, Ithaca, N. Y., has been appointed executive director of research, Mellon Institute of Industrial Research, Pittsburgh.

TOM S. GABLE * has resigned from the Division of Environmental Health and Sanitation of the University of Nebraska Health Service, Lincoln, to become a district public health engineer in charge of a general environmental health program of the new Allegheny County Health Department, Pittsburgh, Pa.

S. W. FRIEDMAN, D.D.S.,† former administrator, Southern Division, Albert Einstein Medical Center, Philadelphia, Pa., is now assistant to the executive vice-president, in charge of professional affairs, and has been succeeded by J. A. ROSENKRANTZ, M.D.

JAMES GARY GARDNER, sanitary engineer, is now with Water Pollution Control, Regional Office, Public Health Service, Charlottesville, Va.

LLOYD W. GEBHARD, P.E., formerly assistant chief, Division of Sanitary Engineering, Federal Civil Defense Administration, Battle Creek, Mich., is now assistant regional engineer, Regional Office, Public Health Service, Charlottesville, Va.

JAMES T. GOOCH, M.D., M.P.H.,* former health officer, Lincoln-Lancaster County (Neb.), has been appointed health officer of the new Erie County (Pa.) Health Department voted through a citizen's referendum in November.

G. HOWARD GOWEN, M.D., Ph.D.,* deputy director in charge of the Division of Hospitals and Chronic Illness, Illinois Department of Public Health, has received the 1956 award of the American Cancer Society in recognition of his "important contributions to the control of cancer."

ROBERT H. HAMLIN, M.D., M.P.H., LL.B.,* health officer of Brookline, Mass., has resigned to become adviser on basic legislative policy to the Secretary of Health, Education and Welfare, Washington, D. C.

JULIAN G. HANLON, formerly with the Social Worker Service, U. S. Veterans Administration Central Office, Washington, D. C., is now regional psychiatric social work consultant, Regional Office, Public Health Service, Charlottesville, Va.

GEORGE F. HARDING, Ph.D., former chief, Clinical Psychological Section, Mental Hygiene Clinic, Schofield Barracks, is psychological services administrator, Hawaii Territorial Department of Health.

THOMAS A. HART, Ph.D.,* who was chief, Division of Education and acting chief, Division of Health and Sanitation, USOM Bolivia, has been transferred to Brazil as chief, Division of Education USOM Brazil.

ELSIE K. HO, M.A.,† former nursing instructor in psychosomatic medicine, University of Maryland School of Nursing, Baltimore, is now mental health nursing consultant, Regional Office, Public Health Service, Charlottesville, Va.

---

* Fellow.
† Member.

HUGH R. JACKSON, president, Better Business Bureau of New York City, Inc., has been elected president, National Social Welfare Assembly.

BURTON KANE KILBOURNE, M.D.,* one-time Montana state health officer and more recently, health officer for Big Horn and Rosebud Counties, has retired and has been succeeded by MAUDE GERDES, M.D.,† former practicing physician of Billings.

J. KENNETH KIRK, former technical administrative officer, Bureau of Enforcement, has succeeded F. LESLIE HART, retired, as chief, Boston District, U. S. Food and Drug Administration. Mr. Hart is now serving in Rio de Janeiro as a consultant of the Pan American Sanitary Bureau.

MICHAEL DAVID LAMBE, former senior laboratory technician, Veterinary Research Laboratory, Department of Agriculture, Dublin, Ireland, has been appointed bacteriologist, Montana State Department of Health.

WALLACE LANE, M.D., former health officer, Kansas City-Wyandotte County, is now director, Venereal Disease Control and Civil Defense Planning, Washington State Department of Health, Seattle.

AIMS CHAMBERLAIN MCGUINNESS, M.D.,† who recently completed the staffing of the 10-hospital system of the United Mine Workers Welfare and Retirement Fund, has succeeded LOWELL T. COGGESHALL, M.D.,* as special assistant for Health and Medical Affairs, U. S. Department of Health, Education and Welfare.

ERIC L. O'NEAL, M.D., has succeeded ROY A. ANDUZE, M.D.,† resigned, as commissioner of health, Virgin Islands.

STEPHEN A. RICHARDSON, former research associate and study director, Field Methods Training Program, Social Science Research Center, Cornell University, is now assistant director, Association for the Aid of Crippled Children.

LEONORA RUBINOW, former state consultant, Medical Social Rehabilitation Division of Chronic Illness Control, New Jersey State Department of Health, is now assistant executive secretary, Medical Social Work Section, National Association of Social Workers, with offices in New York City.

MEADIE M. SWITZER, former specialist in health education, Mississippi Agricultural Extension Service and Mississippi Department of Health, has been appointed public health educator, Syracuse District Office, New York State Department of Health.

IRVING R. TABERSHAW, M.D.,† director, Division of Industrial Hygiene, New York State Department of Labor, has become director of health and safety, Nuclear Development Corporation of America, White Plains, N. Y. He will continue also as associate professor of occupational medicine, Columbia University School of Public Health and Administrative Medicine.

THOMAS L. THOMAS, M.D., is the health officer of Wheeling-Ohio County (W.Va.) Health Department, succeeding the late JOHN WESLEY GILMORE, M.D.*

DOROTHY D. WATTS, R.N., M.P.H.,† former health educator, New York City Department of Health, is now an instructor, Department of Preventive Medicine and Public Health, Howard University School of Medicine, Washington, D. C.

GARLAND L. WEIDNER, M.D., M.P.H.,† former health officer, Saginaw, Mich., has been appointed director of health, Waterbury, Conn.

JAMES A. WESTBROOK, sanitary engineer, has been transferred from Region V Office of the Public Health Service, to Region III, Charlottesville, Va., where he is milk and food consultant. He succeeds DAROLD TAYLOR,† transferred to the Washington, D. C., office.

JOHN S. WHEELER, M.D., M.P.H., health officer of New Hampshire, has resigned to become health officer of Lewis County, Chehalis, Wash., succeeding MORRIS CHELSKY, M.D., M.P.H., now health officer of the neighboring Clark-Skamania district, Vancouver.

ROBERT D. WRIGHT, M.D., M.P.H.,† former head, Department of Social and Environmental Medicine, University of Virginia Medical School, is now general health services consultant, Regional Office, Public Health Service, Charlottesville, Va.

WILLIAM P. WOLLSCHLAGER, former sanitarian, Missoula and Mineral Counties, has been appointed a sanitarian, Montana State Health Department.

DEATHS

IRMA BIEHUSEN, M.P.H.,† state service director, American Cancer Society, Connecticut Divison, New Haven (Public Health Education Section).

PROFESSOR GUNNAR A. FISCHER,† professor of hygiene, Royal Carolinian Institute, Tomteboda, Sweden (Epidemiology Section).

BELL GREVE,† director, Department of Public Health and Welfare, City of Cleveland, Ohio (Medical Care Section).

HENRY R. KRAYBILL, Ph.D.,* director of research and education, American Meat Insti-

* Fellow.
† Member.

tute Foundation, September 30, 1956 (Food and Nutrition Section).

AMY R. ROGERS, B.S.,† field secretary and administrative assistant, Arizona Tuberculosis and Health Association, Phoenix, on November 28, 1956 (Public Health Education Section).

CONFERENCES AND DATES

State and Regional Public Health Meetings:

Arizona Public Health Association. Westward Ho Hotel, Phoenix, Ariz. May 6–8.

Colorado Public Health Association. Broadmoor Hotel, Colorado Springs, Colo. May 23–24.

Georgia Public Health Association. Bon Air Hotel, Augusta, Ga. May 12–15.

Idaho Public Health Association. Shore Lodge, McCall, Idaho. May 10–11.

Illinois Public Health Association. Edgewater Beach, Chicago, Ill. April 24–25.

Iowa Public Health Association. Savery Hotel, Des Moines, Iowa. April 10–11.

Kansas Public Health Association. Town House, Kansas City, Kans. April 3–5.

Kentucky Public Health Association, Louisville, Ky., March 13–15.

Michigan Public Health Association. Pantlind Hotel, Grand Rapids, Mich. May 1–3.

Missouri Public Health Association. Hotel Missouri, Jefferson, Mo. May 9–11.

Montana Public Health Association. Fair Hotel, Havre, Mont. April 26–27.

North Carolina Public Health Association with Southern Branch, APHA. Asheville, N. C. May 28–31.

North Dakota Public Health Association. Plainsman Hotel, Williston, N. D. March 25–26.

Ohio Public Health Association. Neil House, Columbus, Ohio. May 28–29.

South Carolina Public Health Association. Ocean Forest, Myrtle Beach, S. C. May 9–11.

Southern Branch, APHA, with North Carolina Public Health Association. Asheville, N. C. May 29–31.

Western Branch, APHA. Lafayette Hotel, Long Beach, Calif. May 29–June 1.

Meetings of Other Organizations Coming in March, April, and May:

Aero Medical Association. Shirley Savoy Hotel, Denver, Colo. May 6–8.

American Mosquito Control Association. DiLido Hotel, Miami Beach, Fla. April 28–May 2.

American National Red Cross Convention. Washington, D. C. May 20–22.

American Orthopsychiatric Association. Hotel Sherman, Chicago, Ill. March 7–9.

American Pharmaceutical Association. Hotel Statler, New York, N. Y. April 28–May 3.

American Psychiatric Association. Chicago, Ill. May 13–17.

Association for the Aid of Crippled Children. Carnegie International Center, New York, N. Y. April 30.

Child Study Association of America. New York, N. Y. March 25–27.

Home Economics Spring Week-End (College of Home Economics). Pennsylvania State University, University Park, Pa. April 12–13.

International Atomic Exposition. Convention Hall, Philadelphia, Pa. March 11–15.

National Advisory Committee on Local Health Departments. Cincinnati, Ohio. March 19.

National Conference on Interstate Milk Shipments. Hotel Peabody, Memphis, Tenn. April 23–25.

National Conference on Rural Health. Louisville, Ky. March 7–9.

National Conference on Social Welfare. Philadelphia, Pa. May 19–24.

National Council on Alcoholism. La Salle Hotel, Chicago, Ill. March 27–29.

National Health Council. Cincinnati, Ohio. March 19–22.

National League for Nursing. Biennial Convention. Chicago, Ill. May 6–10.

National Multiple Sclerosis Society. New York, N. Y. March 12.

National Society for the Prevention of Blindness with the Pan American Association of Ophthalmology. New York, N. Y. April 7–10.

National Tuberculosis Association. Kansas City, Mo. May 5–11.

Pan American Medical Association. Mexico City, Mexico. April 15–21.

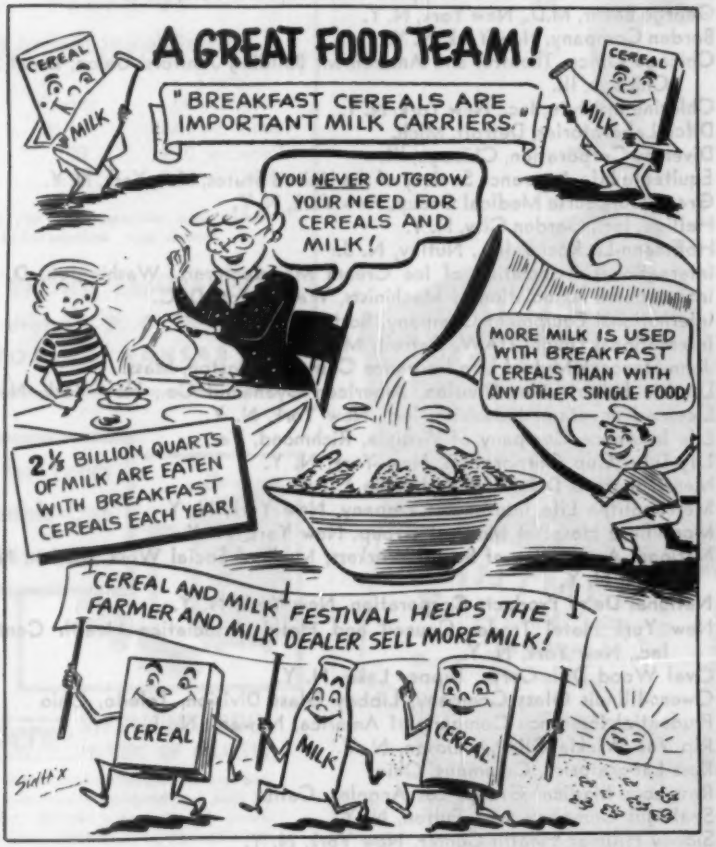
Purdue Industrial Waste Conference. Purdue University, Lafayette, Ind. May 13–15.

U. S. Mexico Border Public Health Association. San Antonio, Tex. April 9–12.

YOU CAN PUBLISH YOUR BOOK
Free brochure tells how we published 2000 books for authors. Free editorial appraisal. Write Dept. JPH
EXPOSITION PRESS / 386 4th Ave., N.Y. 16

The American Dairy Association and the Cereal Institute jointly proclaim

THE 4TH ANNUAL SPRING CEREAL AND MILK FESTIVAL


A GREAT FOOD TEAM!
"BREAKFAST CEREALS ARE IMPORTANT MILK CARRIERS."
CEREAL
MILK
YOU NEVER OUTGROW YOUR NEED FOR CEREALS AND MILK!
MORE MILK IS USED WITH BREAKFAST CEREALS THAN WITH ANY OTHER SINGLE FOOD!
2½ BILLION QUARTS OF MILK ARE EATEN WITH BREAKFAST CEREALS EACH YEAR!
CEREAL AND MILK FESTIVAL HELPS THE FARMER AND MILK DEALER SELL MORE MILK!
CEREAL
MILK
CEREAL
Sidlo'x

You are invited to cooperate with this Fourth Annual Spring Cereal and Milk Festival this April. There are few foods that can better the nutritional composition of the cereal and milk serving at such low cost. Write for free Cereal and Milk Source Book.

CEREAL INSTITUTE, Inc., 135 South La Salle Street, Chicago 3, Illinois
A research and educational endeavor devoted to the betterment of national nutrition

The American Public Health Association acknowledges with deep appreciation its indebtedness to these Sustaining Members whose annual dues help support its general program

Sustaining Members

Amalgamated Laundry Workers Health Center, Inc., New York, N. Y.
Amalgamated Meat Cutters and Butcher Workmen of North America, Chicago, Ill.
American Bottlers of Carbonated Beverages, Washington, D. C.
American Can Company, New York, N. Y.
American Federation of Labor and Congress of Industrial Organizations, Washington, D. C.
Association for the Aid of Crippled Children, New York, N. Y.
George Baehr, M.D., New York, N. Y.
Borden Company, New York, N. Y.
Chicago Office, Theatre, and Amusement Building Janitors' Union, Local 25, Chicago, Ill.
Chlorine Institute, Inc., New York, N. Y.
Difco Laboratories, Detroit, Mich.
Diversey Corporation, Chicago, Ill.
Equitable Life Assurance Society of the United States, New York, N. Y.
Grand Concourse Medical Group, New York, N. Y.
Hellige, Inc., Garden City, N. Y.
Hoffmann-La Roche, Inc., Nutley, N. J.
International Association of Ice Cream Manufacturers, Washington, D. C.
International Association of Machinists, Washington, D. C.
International Equipment Company, Boston, Mass.
International Union, UAW, Detroit, Mich.
John Hancock Mutual Life Insurance Company, Boston, Mass.
Lederle Laboratories Division, American Cyanamid Co., New York, N. Y.
Licensed Beverage Industries, Inc., New York, N. Y.
Life Insurance Company of Virginia, Richmond, Va.
Lily-Tulip Cup Corporation, New York, N. Y.
Merck Sharp & Dohme, Philadelphia 1, Pa.
Metropolitan Life Insurance Company, New York, N. Y.
Montefiore Hospital Medical Group, New York, N. Y.
National Association of Social Workers, Medical Social Work Section, New York, N. Y.
National Dairy Products Corporation, New York, N. Y.
New York Hotel Trades Council and Hotel Association Health Center, Inc., New York, N. Y.
Oval Wood Dish Corp., Tupper Lake, N. Y.
Owens-Illinois Glass Company, Libbey Glass Division, Toledo, Ohio
Prudential Insurance Company of America, Newark, N. J.
Rip Van Winkle Clinic, Hudson, N. Y.
Ross Laboratories, Columbus, Ohio
Ross-Loos Medical Group, Los Angeles, Calif.
Sealright Company, Inc., Fulton, N. Y.
Sidney Hillman Health Center, New York, N. Y.
Sodiphene Company, Kansas City, Mo.
E. R. Squibb and Sons, New York, N. Y.
Steiner Sales Company, Chicago, Ill.
Sun Life Insurance Company, Baltimore, Md.
Travelers Insurance Company, Hartford, Conn.
Union Central Life Insurance Company, Cincinnati, Ohio
Upjohn Company, Kalamazoo, Mich.
Winthrop Laboratories, Inc., New York, N. Y.
Wyeth Laboratories, Inc., Philadelphia, Pa.

SHEEP CELLS

PREPAID

Via Air Mail Special Delivery

	Weekly	Every Two Weeks
15 cc	$6.70	$3.60 per month
30 cc	7.70	4.10 per month
60 cc	9.70	6.10 per month

Write for free sample and other information you desire

THE BROWN LABORATORY
302 Watson, P. O. Box 424
TOPEKA, KANSAS

Built for years of trouble-free operation . . .

modern SWIMMING POOL FILTERS OF QUALITY

Modern filters stand up longer, perform better, because they're designed and built by a leading manufacturer with 21 years' "know-how." Technical co-operation in maintaining high sanitary standards is still another reason why health authorities recommend *Modern*.

Send for big FREE Catalog No. 22C

modern SWIMMING POOL CO., INC.
One Holland Avenue, White Plains, N. Y.
See your classified phone directory for nearest distributor, or write us.

TINEA CAPITIS

(ringworm of the scalp)

a distressing public health problem

OINTMENT SALUNDEK® (NEW)
Brand of ZINCHLORUNDESAL

A PRACTICAL ANSWER

N.N.R. (1955) describes Ointment Salundek (New) as an effective topical agent for the treatment of tinea capitis.

Write for samples and literature

Available at all pharmacies.

PSA-11

Maltbie MALTBIE LABORATORIES DIVISION
WALLACE & TIERNAN INC.
25 MAIN ST., BELLEVILLE 9, NEW JERSEY, U.S.A.

AMERICAN PUBLIC HEALTH ASSOCIATION, Inc.

1790 Broadway at 58th Street New York 19, N. Y.

Publications of the APHA

American Journal of Public Health and the Nation's Health. Single copies..... $1.00
APHA Year Books..... $1.50
An Appraisal Method for Measuring the Quality of Housing: A Yardstick for Health Officers, Housing Officials and Planners:
Part I. Nature and Uses of the Method. 1945 71 pp. $1.00
Part II. Appraisal of Dwelling Conditions. Vol. A—Director's Manual, $3.00. Vol. B—Field Procedures. $2.00. Vol. C—Office Procedures, $2.00. 1946; or three for..... $6.00
Part III. Appraisal of Neighborhood Environment 1950. 132 pp. $3.00
Basic Principles of Healthful Housing. 2d ed. reprinted 1950. 24 pp..... .50
Care of Laboratory Animals. 1954. 32 pp..... .75
Control of Communicable Diseases in Man. 8th ed. 1955. 212 pp..... .60
Diagnostic Procedures and Reagents. Technics for the Laboratory Diagnosis and Control of the Communicable Diseases. 3rd ed., 1950 589 pp..... $6.00
Diagnostic Procedures for Virus and Rickettsial Diseases. 2nd ed. 1956. 512 pp..... $7.50
Directory of Public Health Statisticians. 3th ed. 1953. 48 pp..... $1.00
Evaluation Schedule. For use in the study and appraisal of community health programs..... .70
General Medical Care Programs in Local Health Departments. Milton Terris and Nathan Kramer. 1951. 129 pp..... .60
Guide for the Medical and Public Health Nursing Supervision of Tuberculosis Cases and Contacts. 1953. 24 pp..... .30
Guide to a Community Health Study. Revised 1955. 64 pp..... $1.00
Guides to Services for Handicapped Children: 1955.
Cerebral Palsy—108 pp..... $1.50
Cleft Lip and Cleft Palate—88 pp..... $1.50
Dentofacial Handicaps—80 pp..... $1.50
Handicapped Children—150 pp..... $1.50
Hearing Impairment—1956. 108 pp..... $1.50
Vision and Eye Problems—1956. 108 pp..... $1.50
Health Practice indices 1947–1948. A collection of charts showing the range of accomplishments in various fields of community health services. 90 pp..... $1.00
Health Supervision of Young Children. 180 pp... $2.00
Housing An Aging Population. 1953. 92 pp..... $1.00
Methods for Determining Lead in Air and in Biological Materials. 2nd ed. 1955. 69 pp.... $1.25
Nutrition Practices: A Guide for Public Health Administrators. 80 pp..... $1.00
Occupational Lead Exposure and Lead Poisoning. 1943. 67 pp..... .50
Panum on Measles. By P. L. Panum (Translation from the Danish). Delta Omega ed., 1940. 111 pp..... $2.50
Proposed Housing Ordinance. 1952. 24 pp..... .75
Public Health Career Pamphlets.
Public Health—A Career with a Future. Revised edition, 1954..... .25
Statistician 1955 } 1–5 copies free; 6–99 copies ea.. 10¢
Selected Papers of Haven Emerson. 1949. 587 pp..... $3.00
Selected Papers of Joseph W. Mountin, M.D. 1956. 356 pp..... $5.00
"Shattuck Report," The. Report of the Sanitary Commission of Massachusetts: 1850. 321 pp..... $4.50
Standards for Healthful Housing:
Planning the Home for Occupancy. 1950. 98 pp... $2.00
Construction and Equipment of the Home. 1951. 78 pp..... $2.00
Standard Methods for the Examination of Dairy Products. 10th ed., 1953. 343 pp..... $4.75
Microbiological Examination of Milk and Cream: Chapter 2 only. 64 pp..... .75
Photographic Sediment Chart..... $1.50
Standard Methods for the Examination of Water, Sewage and Industrial Wastes. 10th ed. 1955. 522 pp..... $7.50
Special price to members of APHA, AWWA, and FSIWA on prepaid orders only for a single copy $6.50
85 Year Index of the American Journal of Public Health. Years 1911 to 1945. 340 pp. Buckram ed. $7.00. Paper ed..... $3.75
What's the Score? Committee on Administrative Practice. APHA. 1950. 52 pp..... .50

Order from the Book Service — Advance Payment Is Requested

Reprints from the American Journal of Public Health

Bacterial Cleanability of Various Types of Eating Surfaces. February, 1953. 12 pp..... $.25
Bookshelf on Foods and Nutrition. April, 1955. 12 pp..... .25
Bookshelf on Mental Health. April, 1956. 12 pp... .25
Conclusion of a Ten-Year Study of Water Fluoridation. March, 1956. 8 pp..... .10
Certain Aspects of the Microbiology of Frozen Concentrated Orange Juice. June, 1956. 8 pp... .10
Creative Health and the Principle of Habeas Mentum. February, 1956. 12 pp..... .25
Giver's Dilemma. Editorial. October, 1954. 4 pp. Free
How Can We Improve Our Teaching of Public Health? July, 1956..... .10
Lemuel Shattuck — Still a Prophet. February, 1949. 27 pp..... .25
The Local Health Department—Services and Responsibilities. An official statement of the American Public Health Association. March, 1951. 3 pp. .10
Method of Evaluating and Improving the Quality of Medical Care, A. July, 1956. 8 pp..... $.15
Nurses' Training in Mental Health Aspects of Public Health Field Work. June, 1956. 8 pp... .10
On the Use of Sampling in the Field of Public Health. June, 1954. 24 pp..... .60
Public Health Problem of Accidental Poisoning. August, 1956. 8 pp..... .10
Relations Between Mental Health and Public Health. July, 1956. 8 pp..... .10
State Health Department—Services and Responsibilities. February, 1954. 20 pp..... .35
Suggested Home Accident Prevention Activities for Health Departments. May, 1946. 8 pp..... .10
Tax-Supported Health and Welfare Services. January, 1957. 8 pp..... .15
Tax-Supported Medical Care for the Needy. October, 1952. 20 pp..... .10
Where Are We Going in Public Health? Part II —Resolving the Basic Issues. April, 1956. 20 pp. .10

Order from the Book Service — Advance Payment Is Requested

Directory of Health Service

BLACK & VEATCH
Consulting Engineers
Water — Sewage — Electricity — Industry
Reports, Designs, Supervision of Construction, Investigations, Valuation and Rates.
1500 Meadow Lake Parkway, Kansas City 14, Mo.

EMERSON VENABLE, P. E.
Chemist and Chemical Engineer
Atmospheric Pollution.
Industrial Hygiene Chemical Warfare
6111 Fifth Ave., Pittsburgh 32, Pa.

T P I
(Treponema Pallidum Immobilization Test)
Information on fees, and on collection and submission of specimens furnished upon request
THE DICKMAN LABORATORIES
1415 W. Erie Ave. Philadelphia 40, Pa.

PROFESSIONAL EXAMINATION SERVICE
A Personnel Administration Service in the Field of Public Health
Available to State and Local Health Departments and Merit Systems
Examinations Field Consultation
American Public Health Association, Inc.
1790 Broadway, New York 19, N. Y.

AMERICAN PUBLIC HEALTH ASSOCIATION, Inc.
1790 Broadway New York 19, N. Y.

APPLICATION FOR MEMBERSHIP

(Please type or print)

NAME_____

MAILING ADDRESS_____
(street) (city) (zone) (state)

PRESENT POSITION_____
(title) (organization)

BUSINESS ADDRESS_____
(street) (city) (zone) (state)

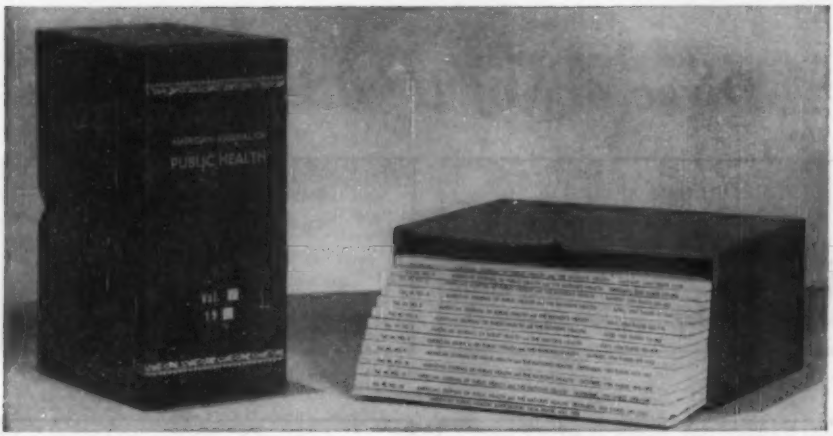
PRIOR EXPERIENCE_____
(title) (organization) (city and state) (dates)

PLACE AND DATE OF BIRTH_____

EDUCATION (schools, dates, degrees if any)_____

PROFESSIONAL SOCIETY MEMBERSHIPS_____

Please complete application on reverse side



Preserve your JOURNALS

with this *Jesse Jones* Volume File

Specially designed and produced for the American Journal of Public Health, this file will keep one volume, or 12 issues, clean, orderly and readily accessible. Picture this distinctive, sturdy Volume File on your book shelf. Its rich red and green Kivar cover looks and feels like leather, and the 16-carat gold leaf hot-embossed lettering makes it a fit companion for your finest bindings.

The Volume File is reasonably priced, in spite of its costly appearance. It is sent postpaid, (except in Canada and in foreign countries) carefully packed, for $2.50 each. Most members will find it more convenient and economical to order 3 for $7.00 or 6 for $13.00. Satisfaction guaranteed. For prompt shipment, order direct from the:

American Public Health Association
1790 Broadway, New York 19, N. Y.

(Continued from previous page)

SECTION AFFILIATION DESIRED (choose only one)

_____Health Officers	_____Food and Nutrition	_____School Health
_____Laboratory	_____Maternal and Child Health	_____Dental Health
_____Statistics	_____Public Health Education	_____Medical Care
_____Engineering and Sanitation	_____Public Health Nursing	_____Mental Health
_____Occupational Health	_____Epidemiology	_____Unaffiliated

ENDORSER: The endorser of this application must be a Member or Fellow of the American Public Health Association. If you cannot obtain the actual signature, print the name and address so that the Administrative Office may procure it for you.

_____ _____
(signature) (address)

ANNUAL DUES: United States $10.00; elsewhere $11.00 to cover postage. The dues cover use of the services maintained by the Association and monthly receipt of the American Journal of Public Health.

The membership year is January through December. Members joining during the first six months of the year will receive the Journal from January through December. Members joining after July 1 will receive the Journal beginning with July; such applicants may pay one year's dues covering the period July through June, or one-and-a-half year's dues, thus adjusting dues to the membership calendar year.

Dues must be received before applications are reviewed by the Committee on Eligibility.

A remittance for $_____is enclosed. Send bill to_____

DATE_____SIGNATURE_____

BBL

CAPPEL

ANIMAL
BLOOD PRODUCTS
and
DIAGNOSTIC REAGENTS

★

Write for New Price List

★

BALTIMORE BIOLOGICAL
LABORATORY, INC.

A Division of Becton, Dickinson & Co.

Baltimore 18, Md.

Lederle mumps vaccine

effective
practical

A specific immunizing antigen for prevention of mumps in children and adults where indicated. Vaccination should be repeated annually.

LEDERLE LABORATORIES DIVISION
AMERICAN CYANAMID COMPANY
PEARL RIVER, NEW YORK

THIS PORTABLE BLACK LIGHT

proving invaluable, effective, time-saving aid in diagnosis of ringworm of scalp

HANOVIA INSPECTOLITE

Public health officials report this lamp to be ideal equipment for medical diagnosis and for fluorescent tests and analyses. A sturdy portable lamp of high power, capable of illuminating large areas, the Hanovia Inspectolite is not only suitable for medical diagnosis of various conditions, but is very valuable for fast, efficient fluorescent testing to determine cleanliness of restaurants and other public places.

HANOVIA SAFE-T-AIRE Effectively reduces hazards of air borne contamination to insure personnel safety. Hanovia produces a wide range of efficient germicidal equipment. Illustrated: Hanovia Safe-T-Aire, available in ceiling, wall and portable models, effectively destroys air borne bacteria and viruses, insures personnel safety.

YOURS ON REQUEST: Technical Bulletin describing Hanovia Inspectolite and Hanovia Safe-T-Aire Equipment. Write for your free copy of these valuable brochures today. Dept. PH 3

HANOVIA CHEMICAL & MFG. CO. GREATEST NAME IN ULTRAVIOLET
ENGELHARD INDUSTRIES

100 Chestnut St., Newark 5, New Jersey
Chicago • Cleveland • Washington, D.C.
Los Angeles • San Francisco

The right start...

The young man getting a start in business or industry needs the help of management, doctor, and homemaker . . . for maintenance of efficient good health.

Many workers have poor eating habits, despite generous food supplies and economic ability to buy them. A survey of 600 men in industry showed nearly half of them to be overweight, one-fifth underweight . . . and one-fourth with evidence of sub-optimal nutrition. Low consumption of milk and of vitamin C rich fruits and vegetables were frequent dietary faults. Breakfast was often omitted, and high-energy, low-nutrient snacks limited intake of nutritious foods.

Research with men and boys shows work output is increased when a good breakfast is eaten. Breakfast containing milk or other protein source reduces mid-morning fatigue . . . gives a feeling of well-being . . . and increases efficiency of protein utilization.

Calcium is the nutrient most frequently found to be low in the diets of working men. Including a glass of milk at breakfast and taking a "milk break" during the day is an easy, economical way of correcting this observed deficiency...and increasing work efficiency.

Three glasses of milk . . . to drink . . . used in food preparation . . . as cheese, or ice cream . . . will provide a man's calcium needs . . . and supply generous quantities of high quality protein and other essential nutrients.

In planning meals for the breadwinner, *milk and milk products are foundation foods for good eating and good health.*

The nutritional statements made by this advertisement have been reviewed by the Council on Foods and Nutrition of the American Medical Association and found consistent with current authoritative medical opinion.

Since 1915 . . . promoting better health through nutrition, research and education.

NATIONAL DAIRY COUNCIL
A non-profit organization
111 N. Canal Street • Chicago 6, Ill.

THIS ADVERTISEMENT IS ONE OF A SERIES. REPRINTS ARE AVAILABLE UPON REQUEST

*Write for booklet giving highlights of single-service spoon study recently made by William T. Ingram, Consulting Engineer and Adjunct Professor of Public Health Engineering, New York University.

COMPLETELY SATISFACTORY SINGLE-SERVICE UTENSILS

• Cleaned on delivery • Cannot be reclaimed and used repeatedly—one use destroys appearance and utility • Smooth—no cutting edges nor splinters • Exclusive, protective sanitary packaging • The only wooden spoon with the true shape of metal ware, strong, rigid, tasteless, odorless. Pure wood only—no dyes nor additives • The only fully shaped single-use spoon available, individually sealed at the factory in tough sanitary paper envelopes, assuring absolute sanitation under the most extreme conditions • Every spoon perfect • Available in 4 sizes, 3½", 5", 6", 7", and OWD Ritefork 6¼"

The smoothness of a disposable spoon becomes important in the light of a recent study* which reveals that a spoon is put into the mouth 10 to 60 times while a person is eating an average portion of ice cream, 40 to 60 times while eating a piece of pie. No other utensils are put into such frequent contact with mouth membranes. This study proved that OWD Ritespoon will not scratch nor cut. Microphotographs show that OWD Ritespoons are the smoothest of all those examined. There are no sharp, jagged and splintered edges. Pressures exerted while eating with an OWD Ritespoon will not bruise nor cut the gums, nor will fragments of the utensil be ingested with food.

We will gladly send you samples, literature.

OWD Ritespoon

Manufactured only by
OVAL WOOD DISH CORPORATION, Tupper Lake, N.Y.
Graybar Bldg., New York 17, N.Y.
506 So. Wabash Ave., Chicago 5, Ill.
The Oval Wood Dish Co. of Canada, Ltd.,
Industrial Center No. 5, Quebec, P. Q.

New DIFCO *Antisera*

BACTO-*C* PROTEIN ANTISERUM

for detection and quantitation of inflammatory diseases

*

BACTO-STREPTOCOCCAL ANTISERA

for detection of Streptococci of Groups A B C D F G

*

BACTO-*E. COLI OB* AND *O* ANTISERA
10 SEROTYPES and 2 POLYVALENT

for identification of Enteropathogenic E. Coli Serotypes

Specify DIFCO *Antisera*

POTENT • SPECIFIC • RELIABLE

AVAILABLE ON REQUEST

Booklet 153—Bacto-C Protein Antiserum
Booklet 154—Bacto-*E. Coli OB* and *O* Antisera
Booklet 155—Bacto-Streptococcal Antisera

DIFCO LABORATORIES

DETROIT 1, MICHIGAN